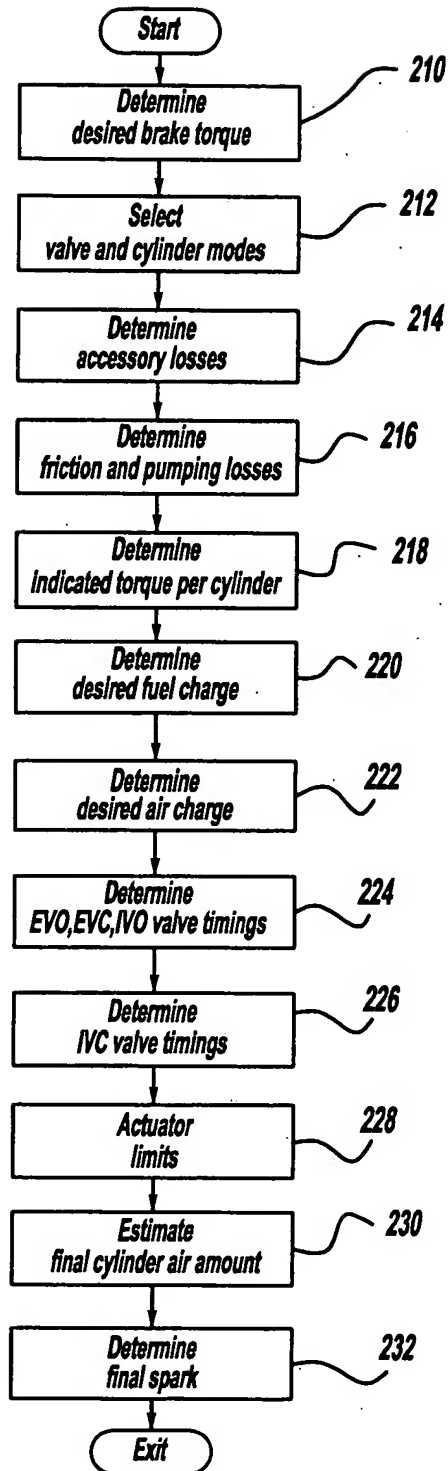
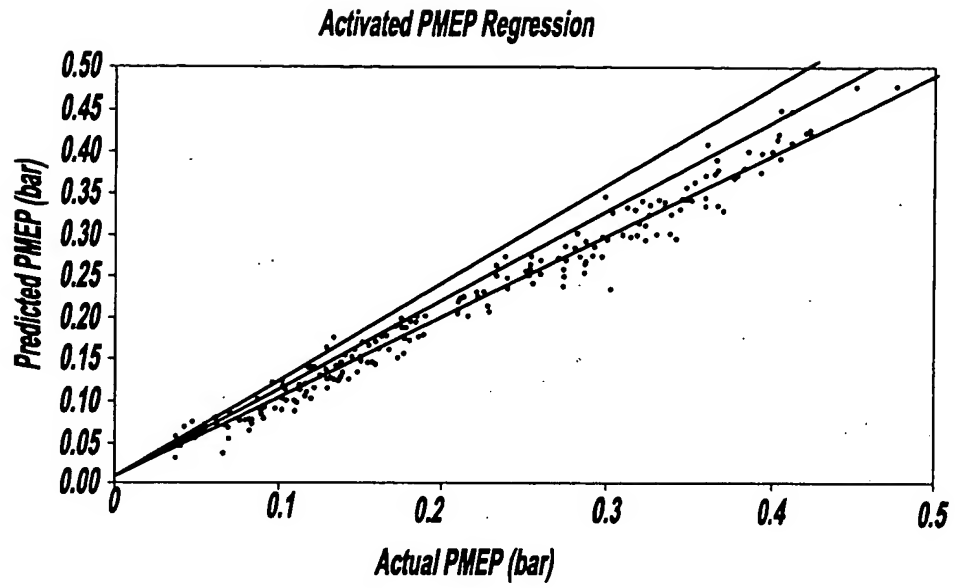
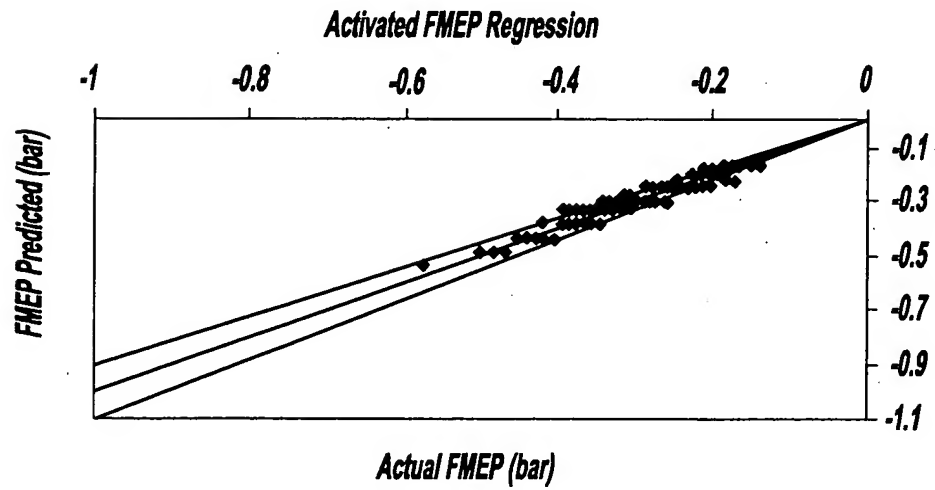


**FIG-1**

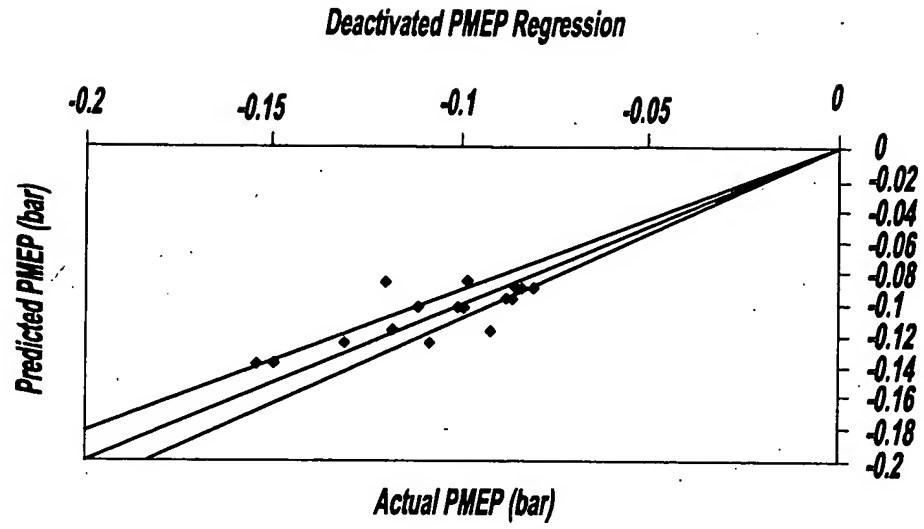
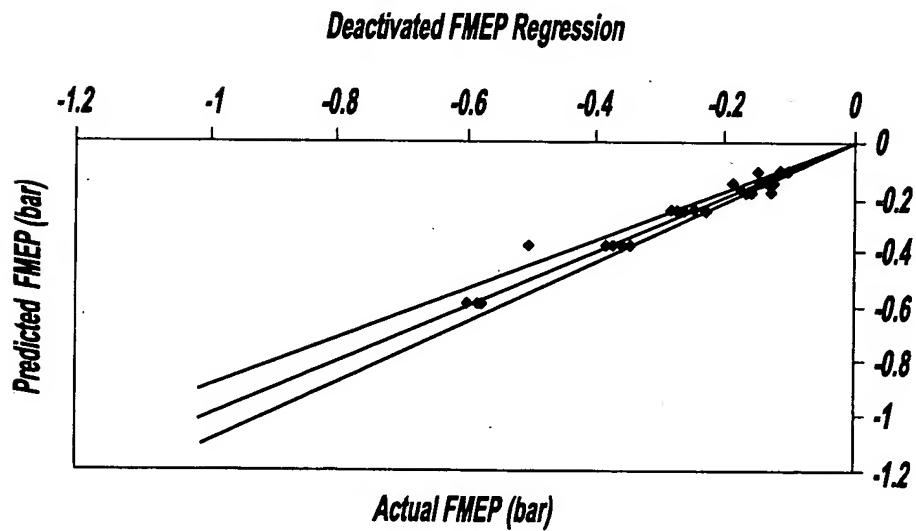
**FIG - 2**

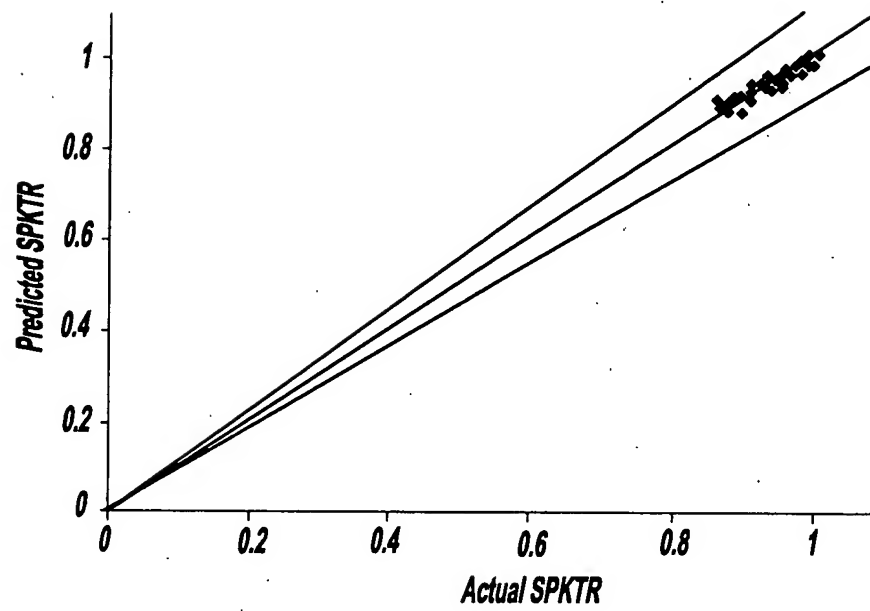


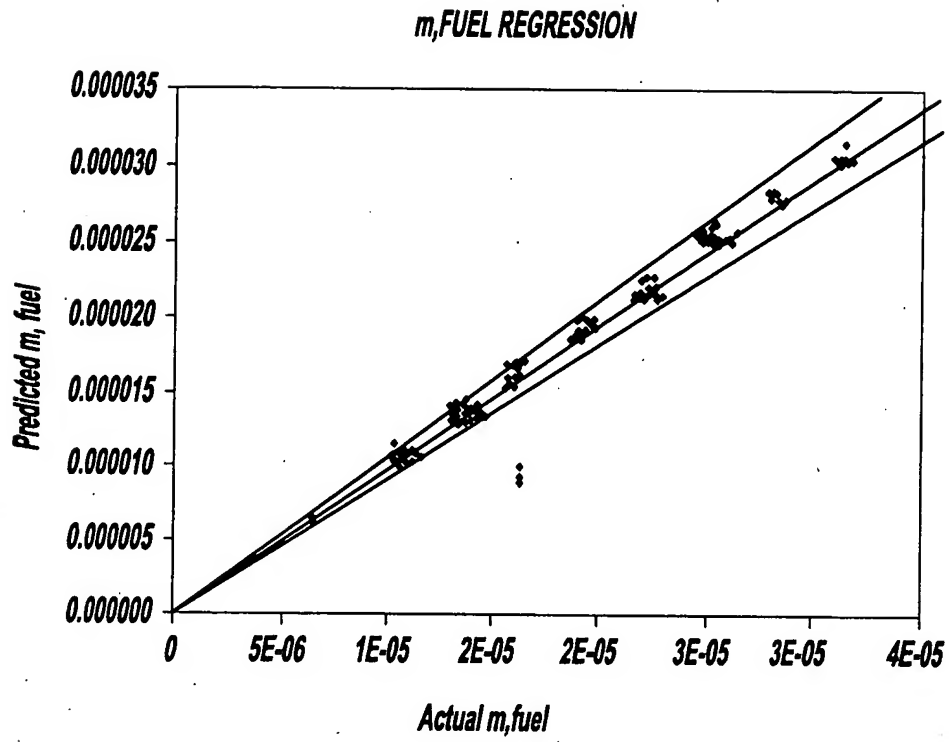
**FIG - 3**



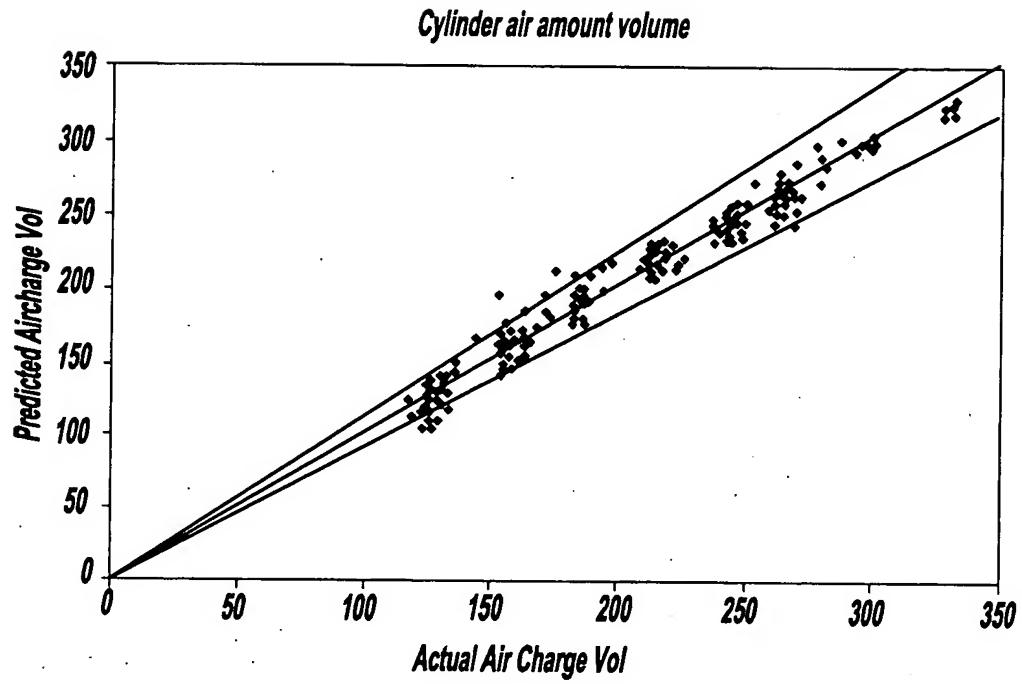
**FIG - 4**

**FIG - 5****FIG - 6**

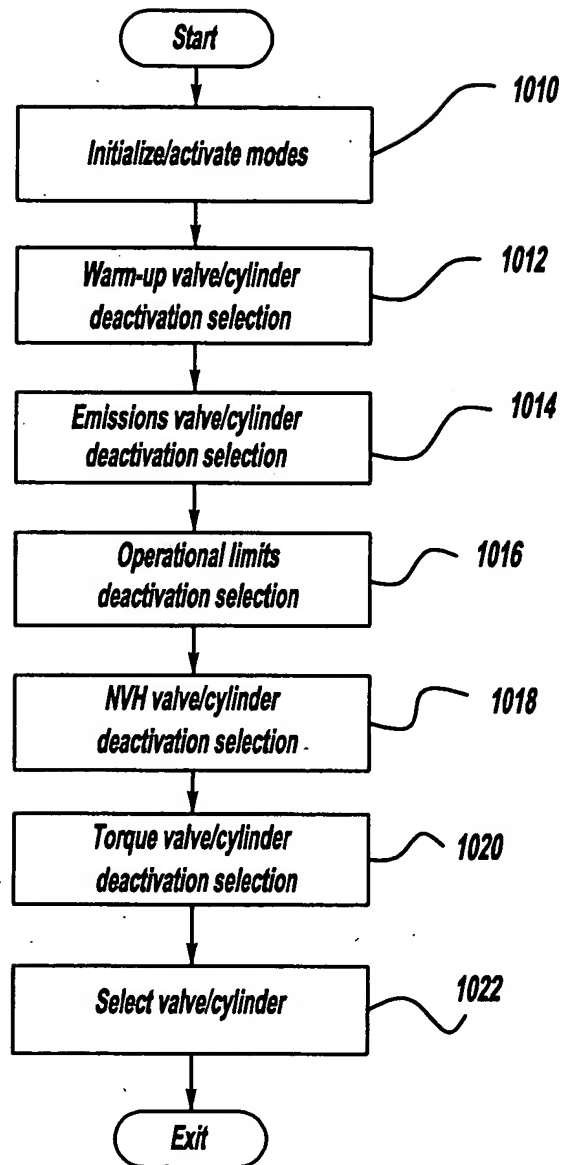
***Spark Retard Torque Reduction Regression*****FIG - 7**

**FIG - 8**

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**FIG - 9**

**FIG - 10**



COLUMN 0                      COLUMN 3

0    3

↓ DECREASING TORQUE ↑

V2	1	1	1	1	ROW 3
12-STROKE	1	1	1	1	
V4	1	1	1	1	
V8	1	1	1	1	ROW 0
	DIDE	DIAE	AIDE	AIAE	

→ DECREASING TORQUE →

**FIG - 11**

COLUMN 0                      COLUMN 3

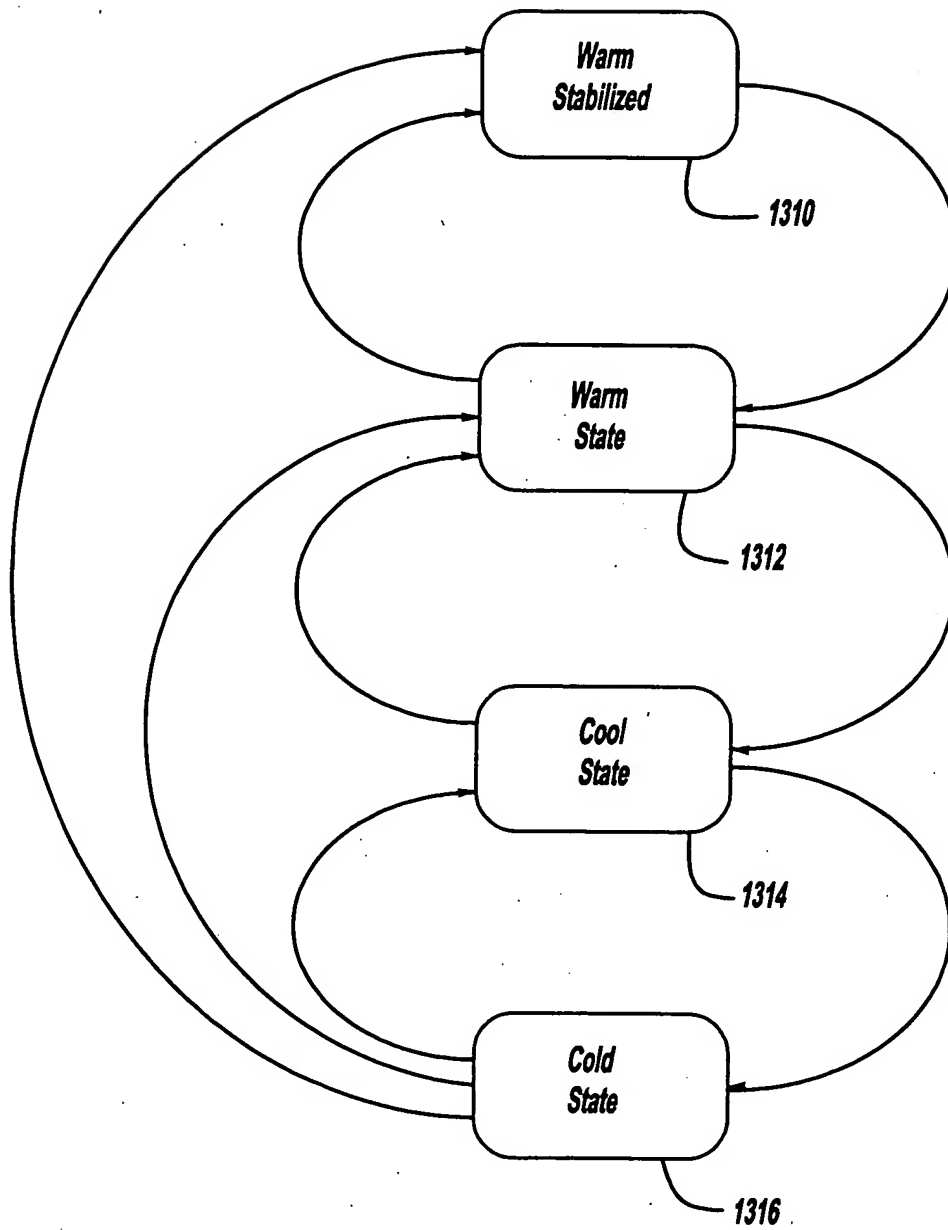
0    3

↓ DECREASING TORQUE ↑

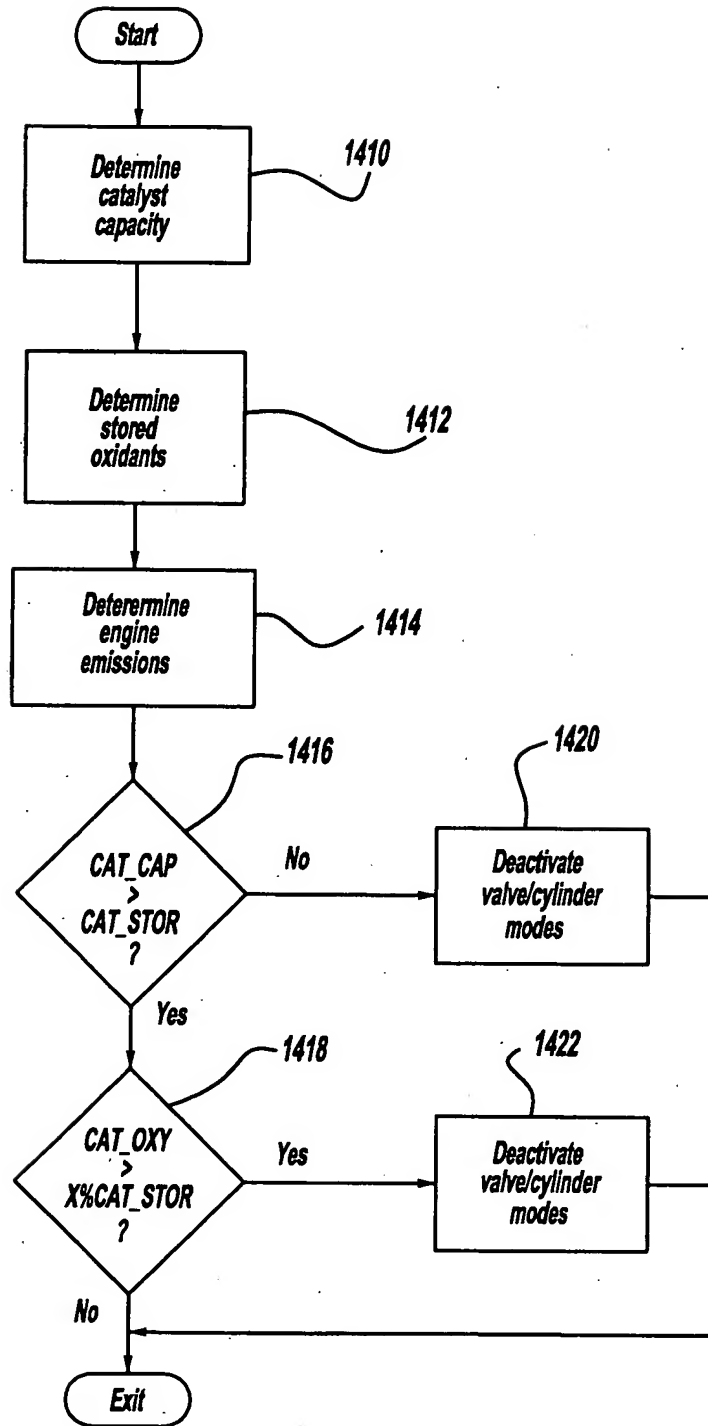
V2	0	0	0	0	ROW 3
12-STROKE	0	0	0	0	
V4	1	1	0	0	
V8	1	1	1	1	ROW 0
	DIDE	DIAE	AIDE	AIAE	

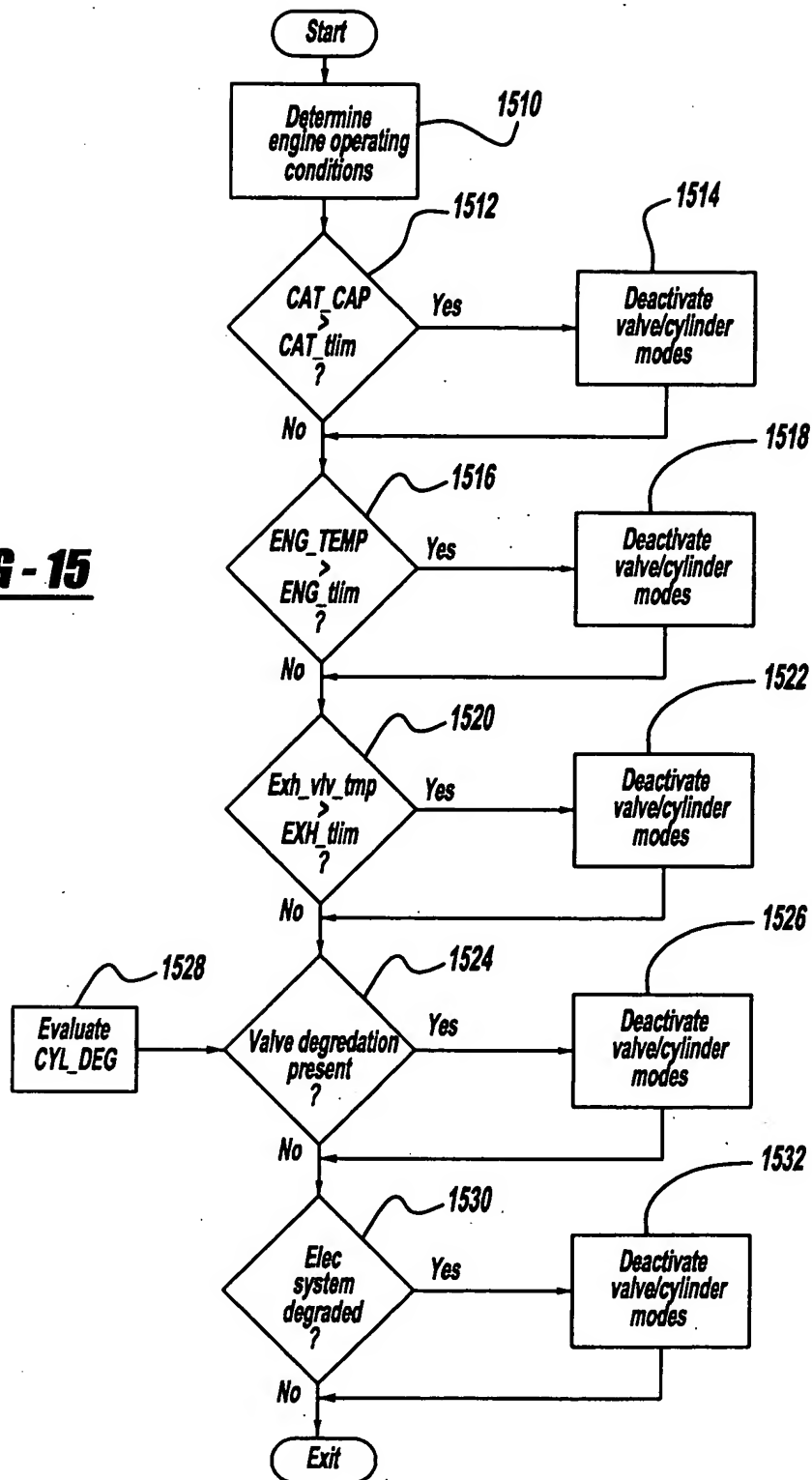
→ DECREASING TORQUE →

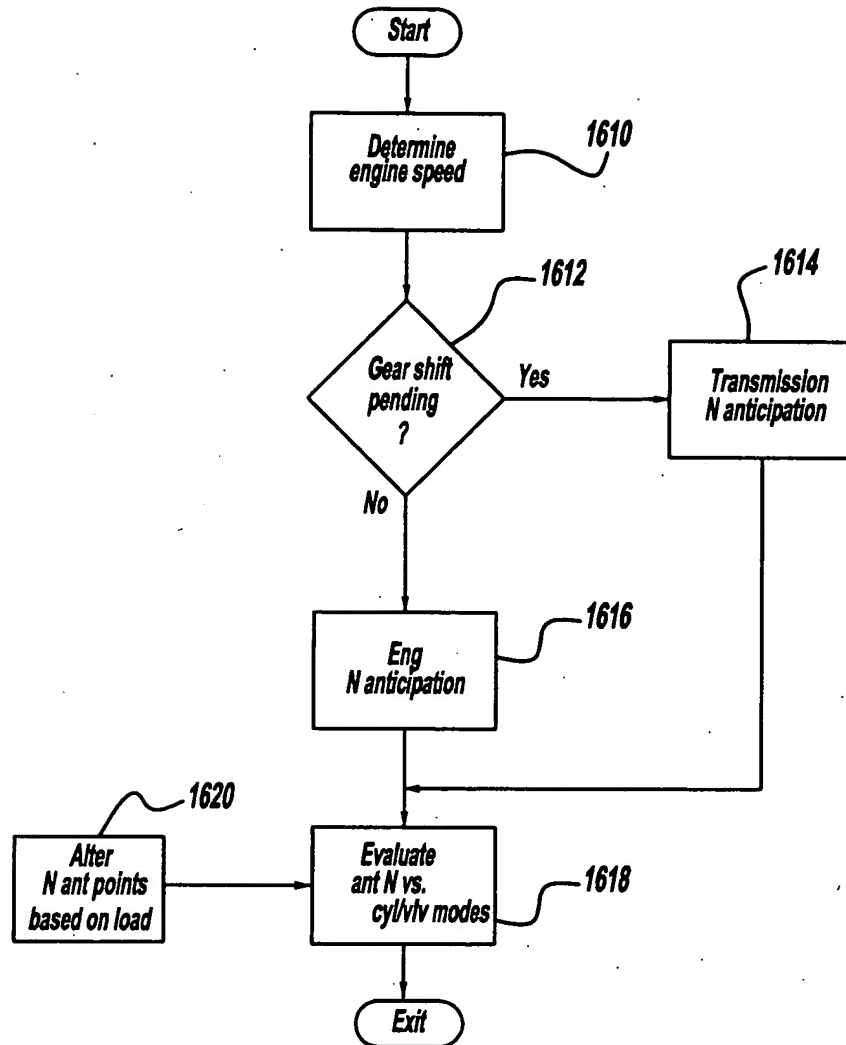
**FIG - 12**

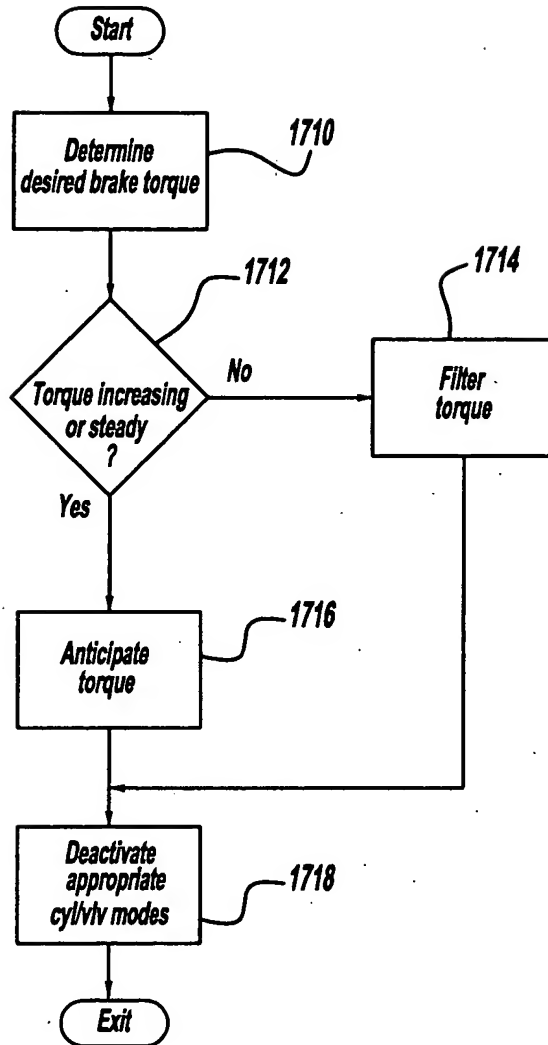


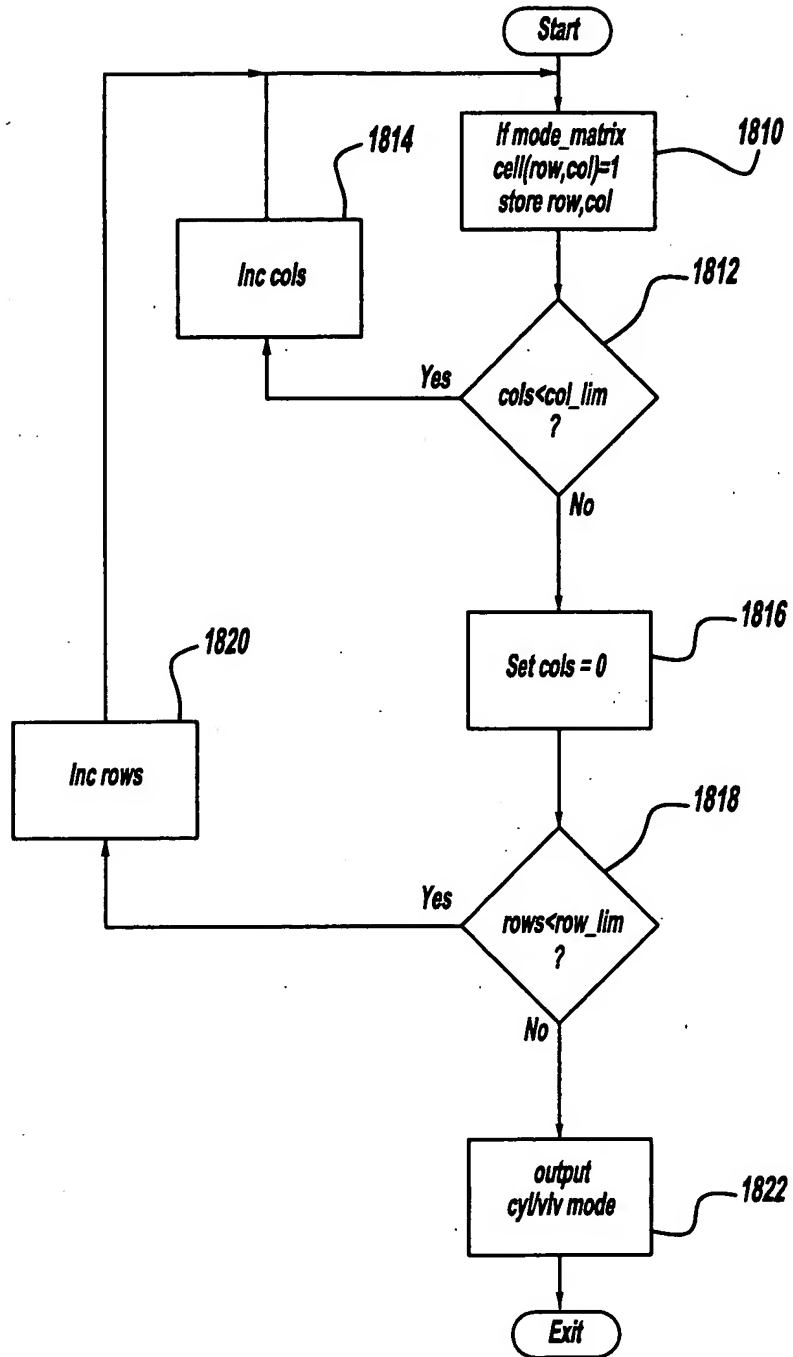
**FIG - 13**

**FIG - 14**

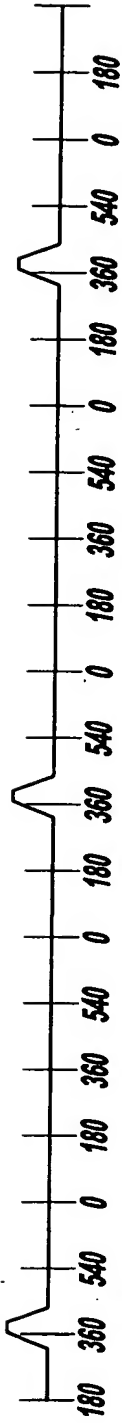
**FIG - 15**

**FIG - 16**

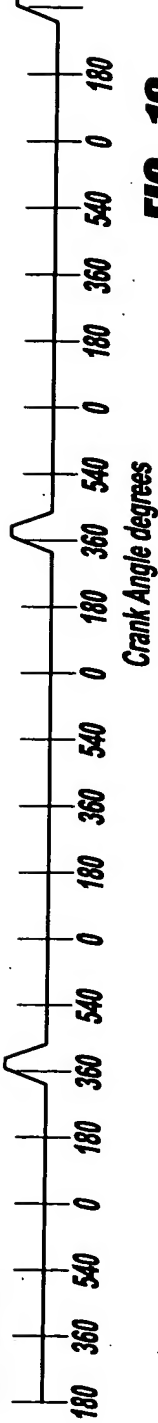
**FIG - 17**

**FIG - 18**

Cylinder #1  
Intake valve A

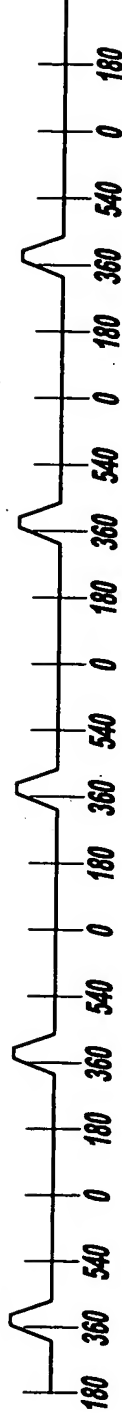


Cylinder #1  
Intake valve B

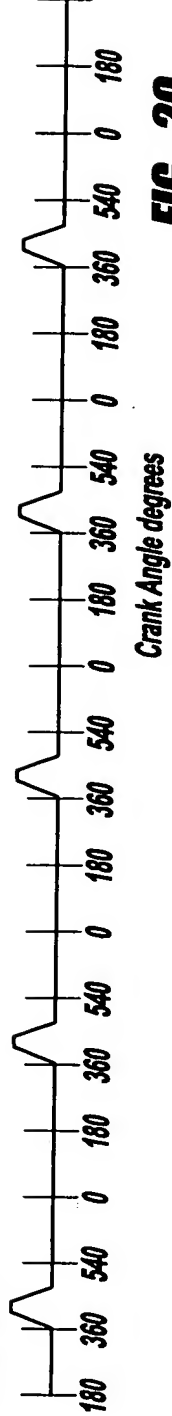


**FIG - 19**

Cylinder #1  
Intake valve A

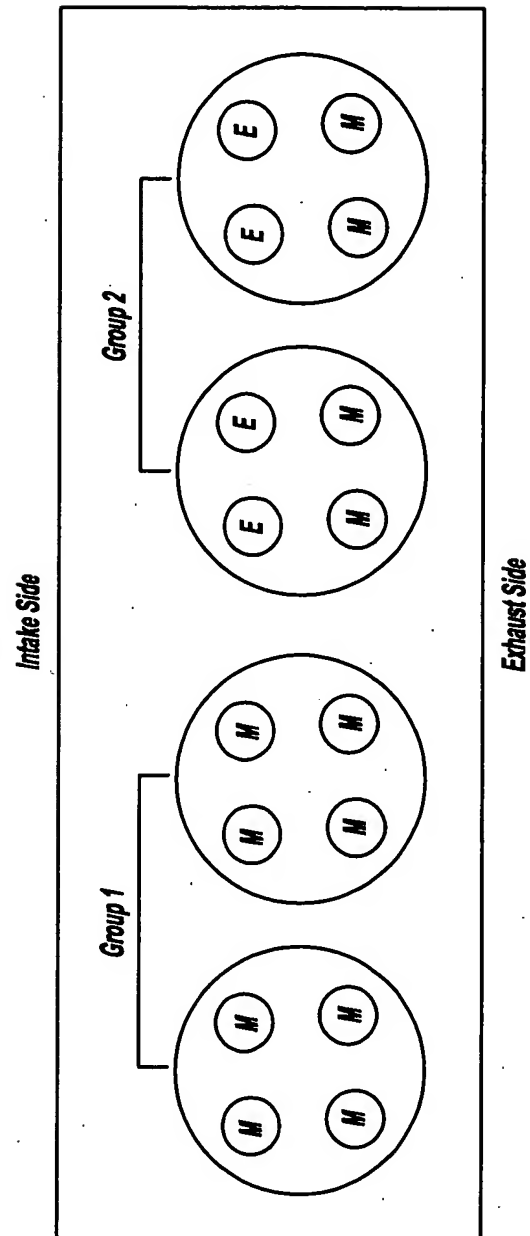


Cylinder #1  
Intake valve B

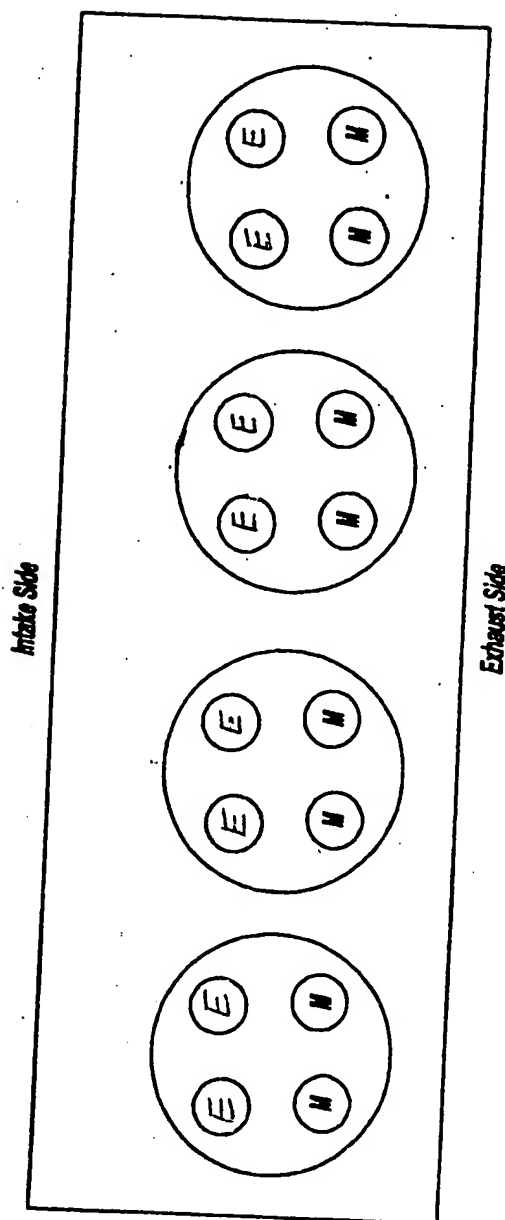


**FIG - 20**

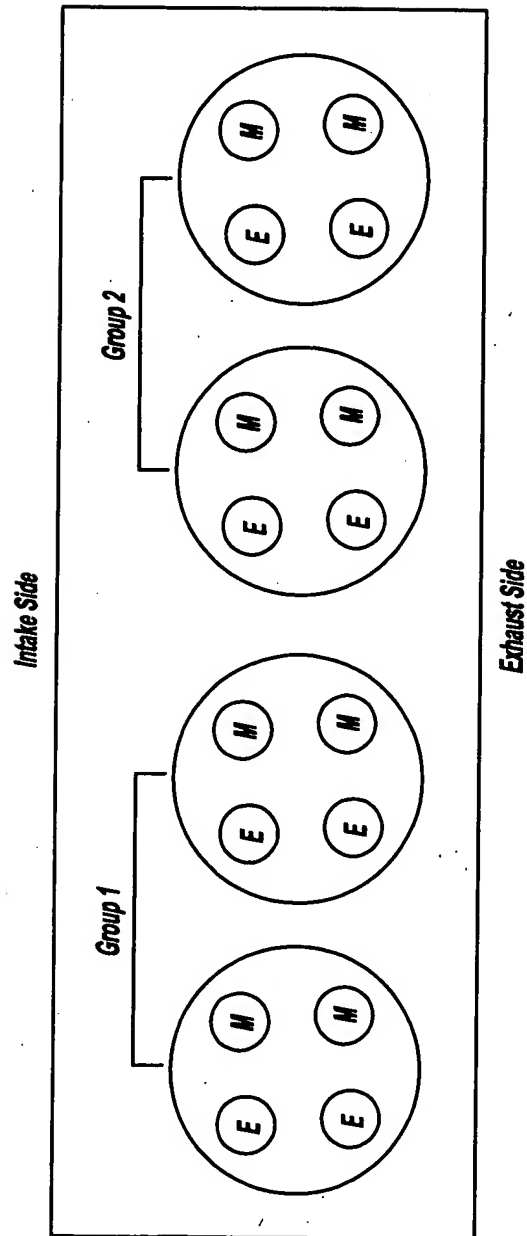




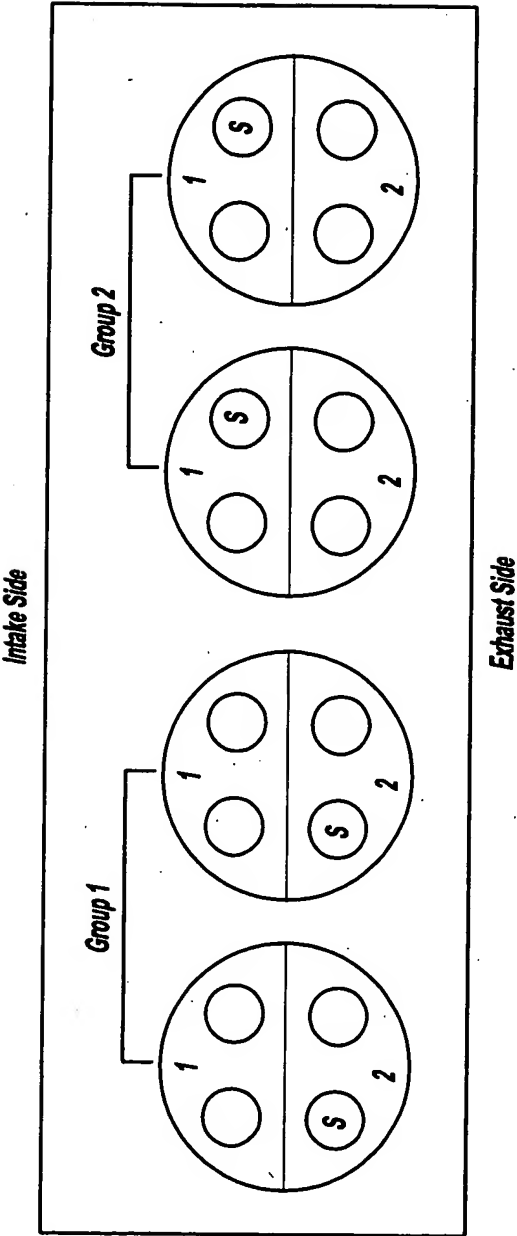
**FIG - 21**



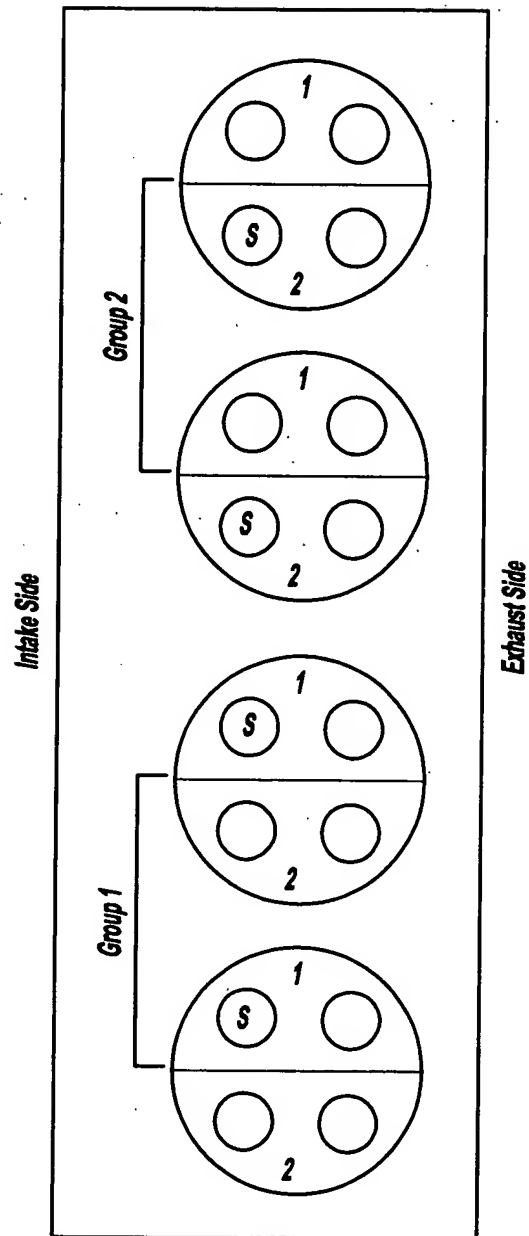
**FIG - 21A**



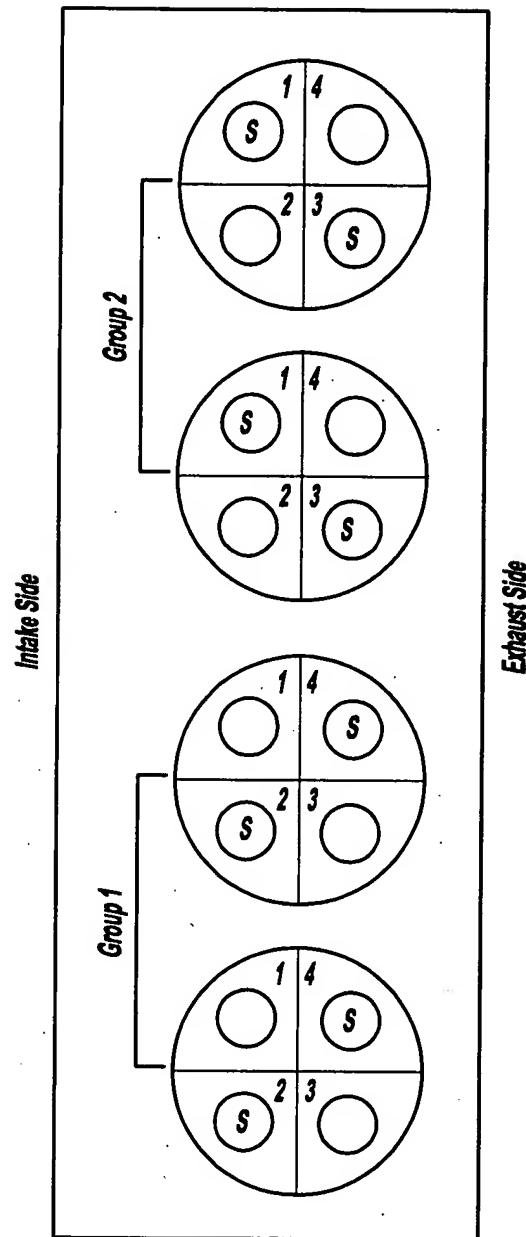
**FIG - 22**



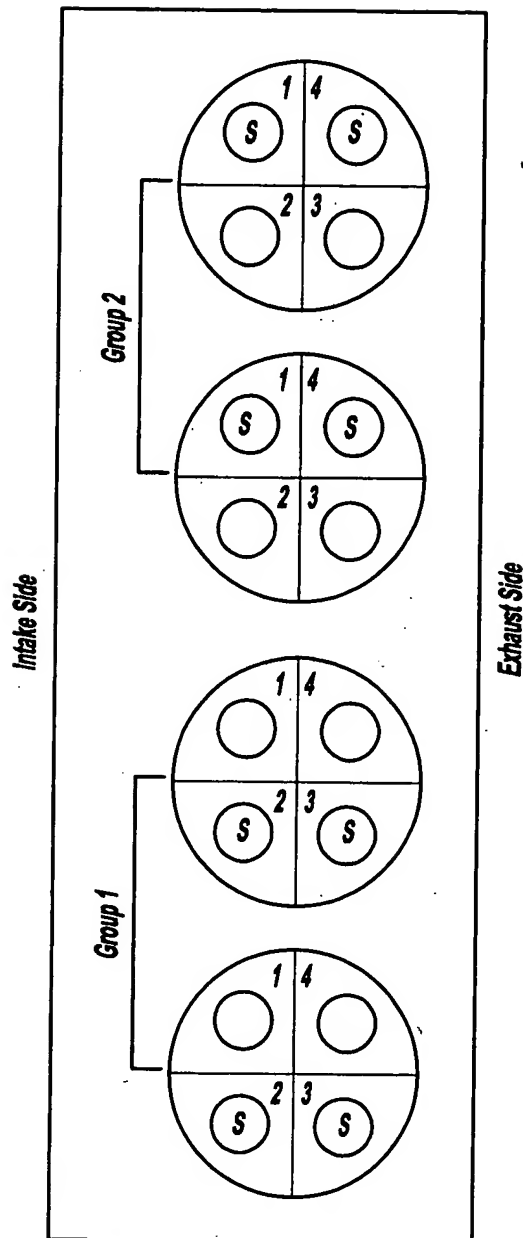
**FIG - 23**



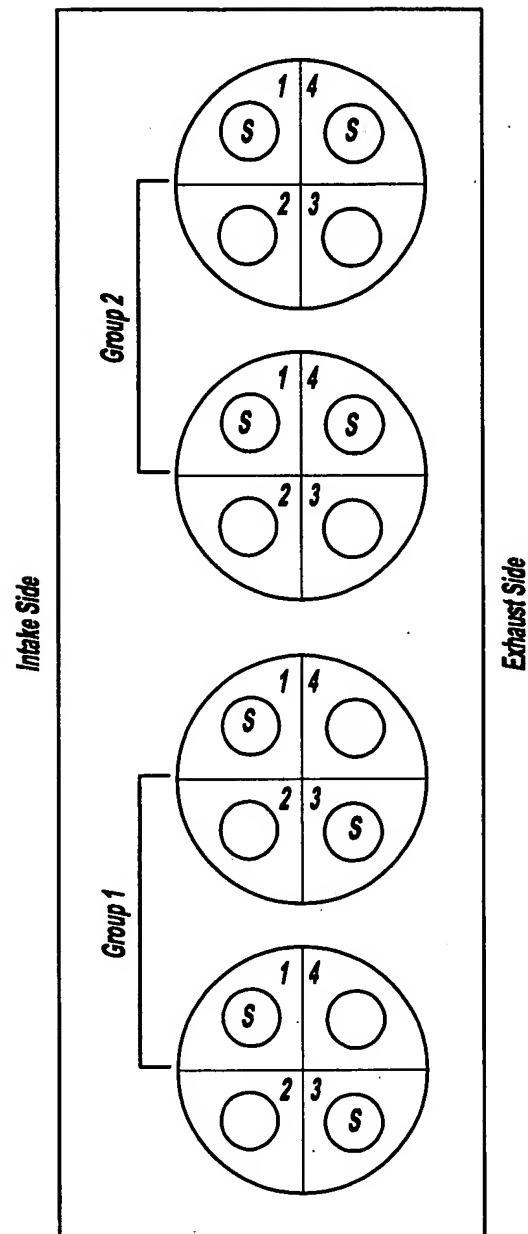
**FIG - 24**



**FIG - 25**

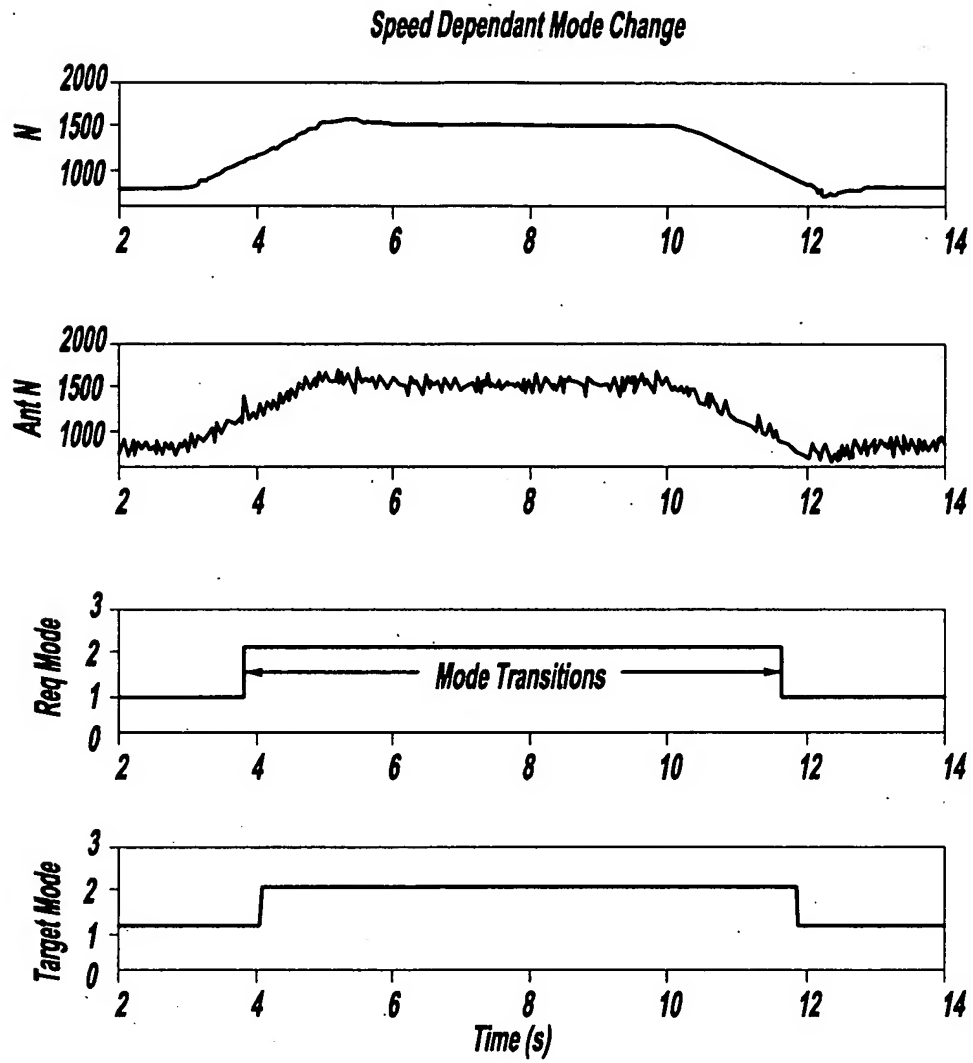


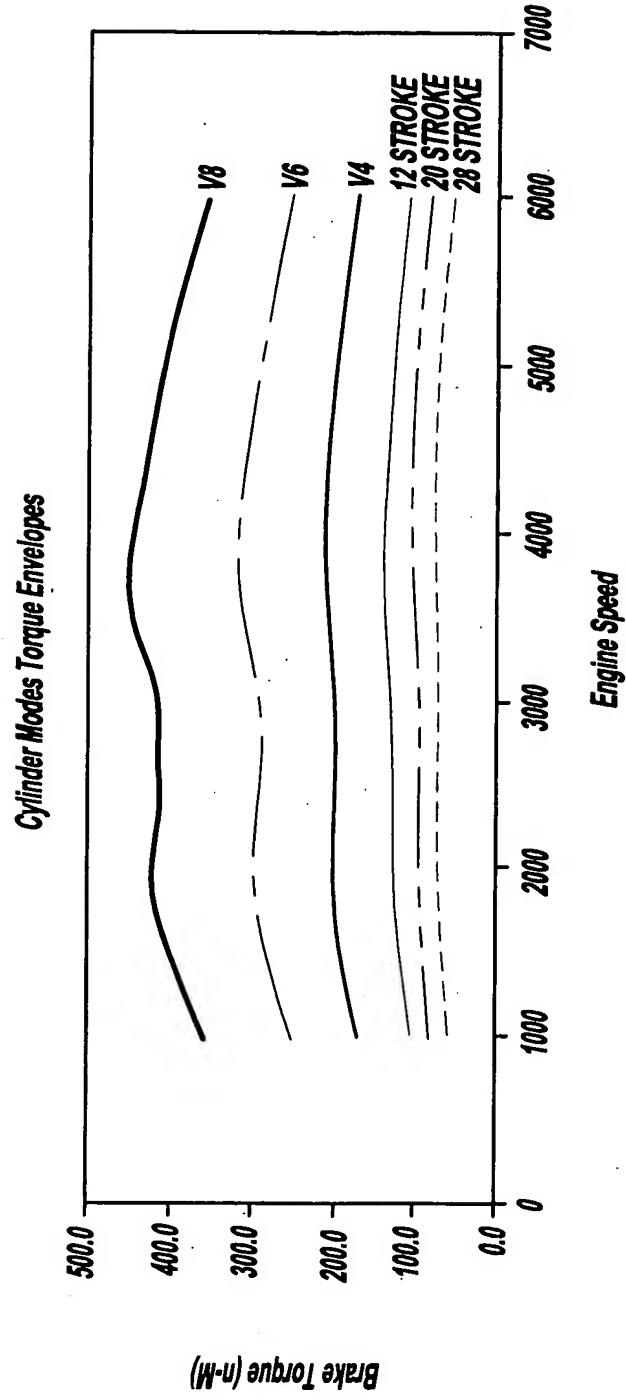
**FIG - 26**



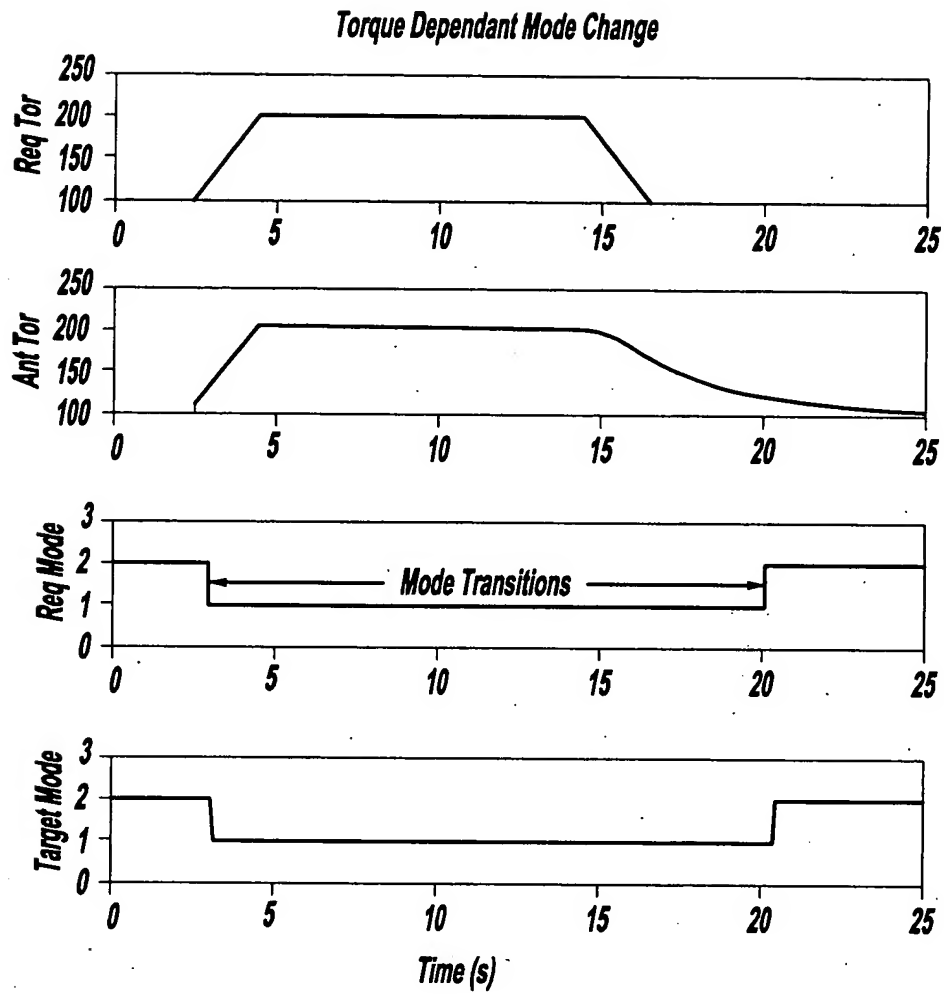
**FIG - 27**



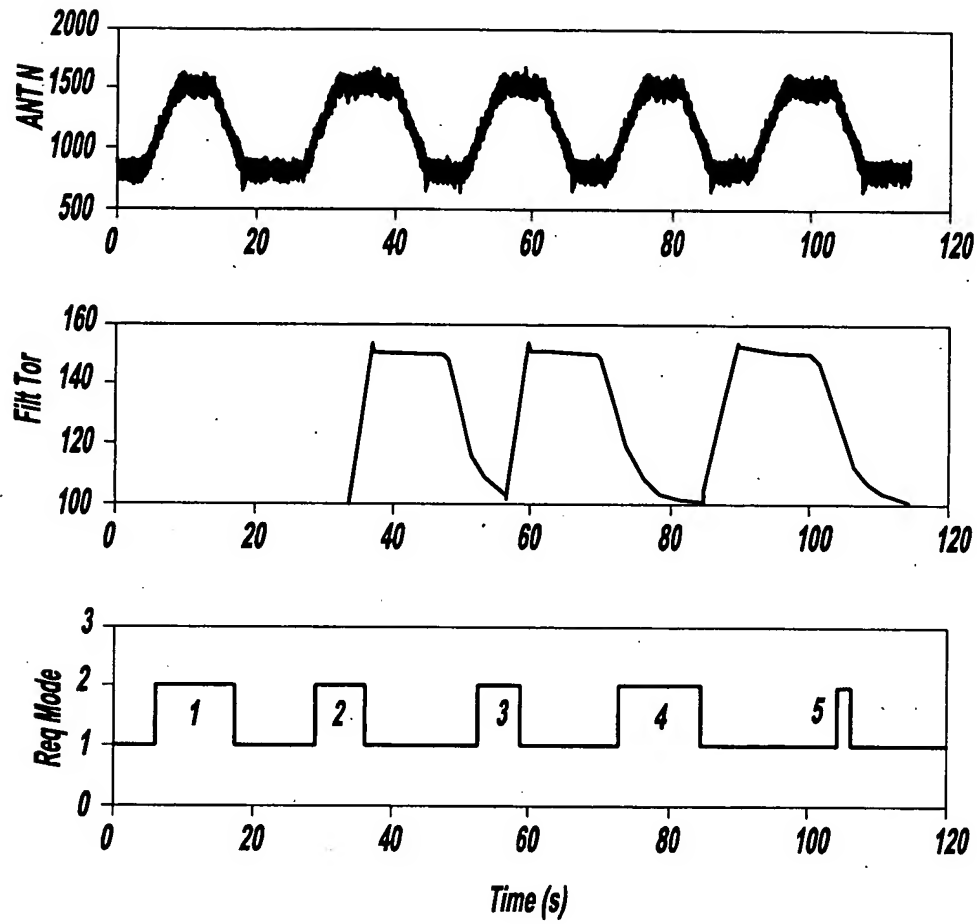
**FIG - 28**

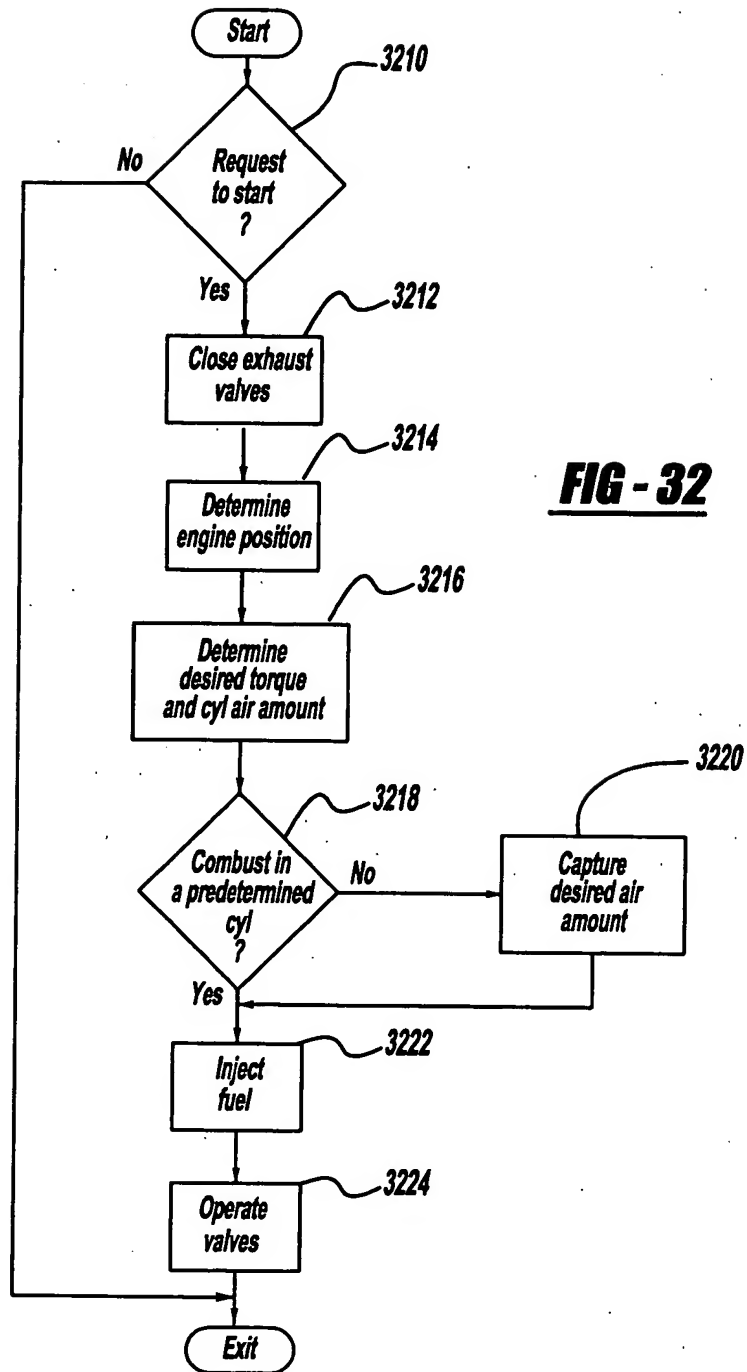
**FIG - 29**

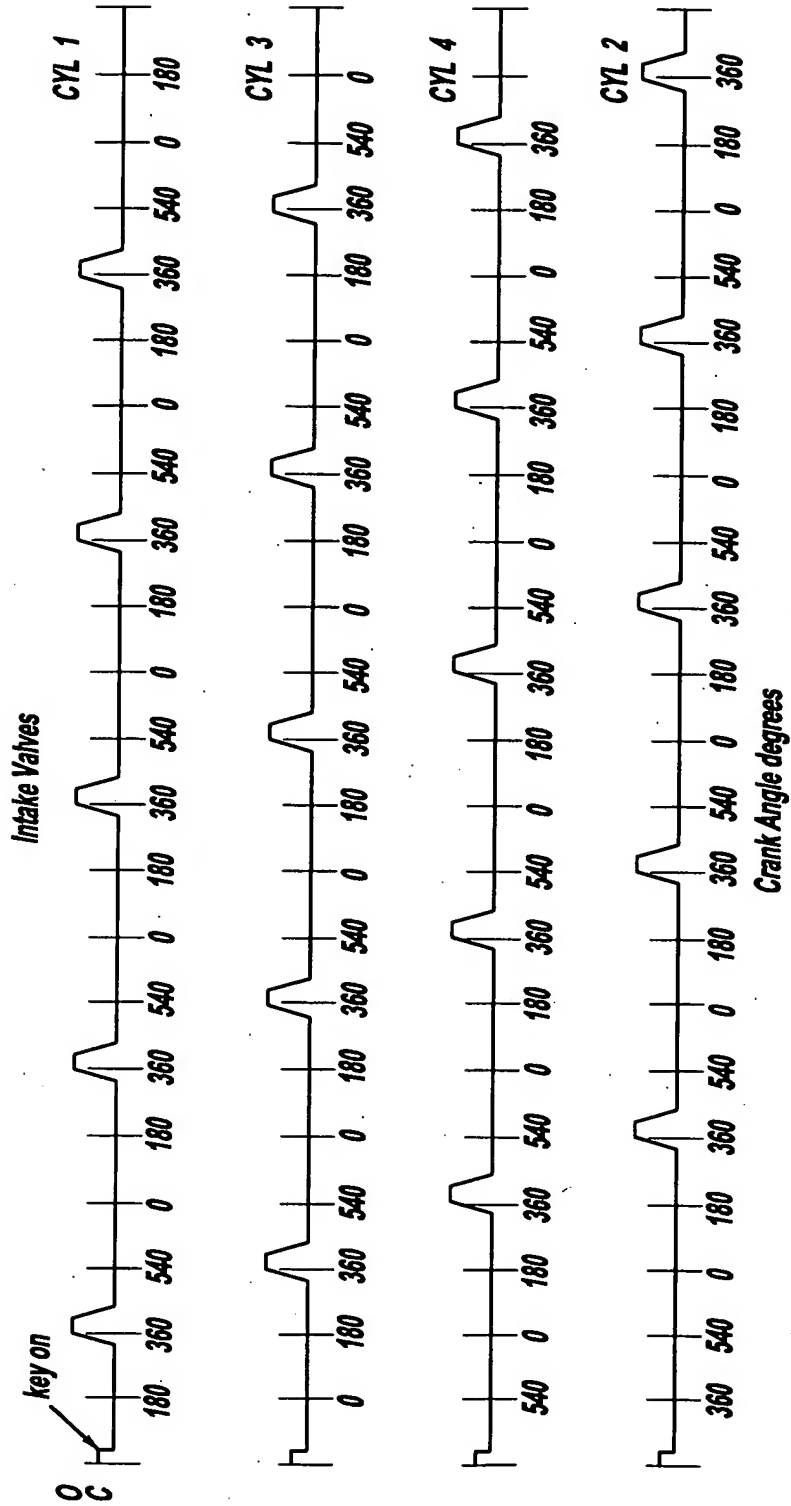
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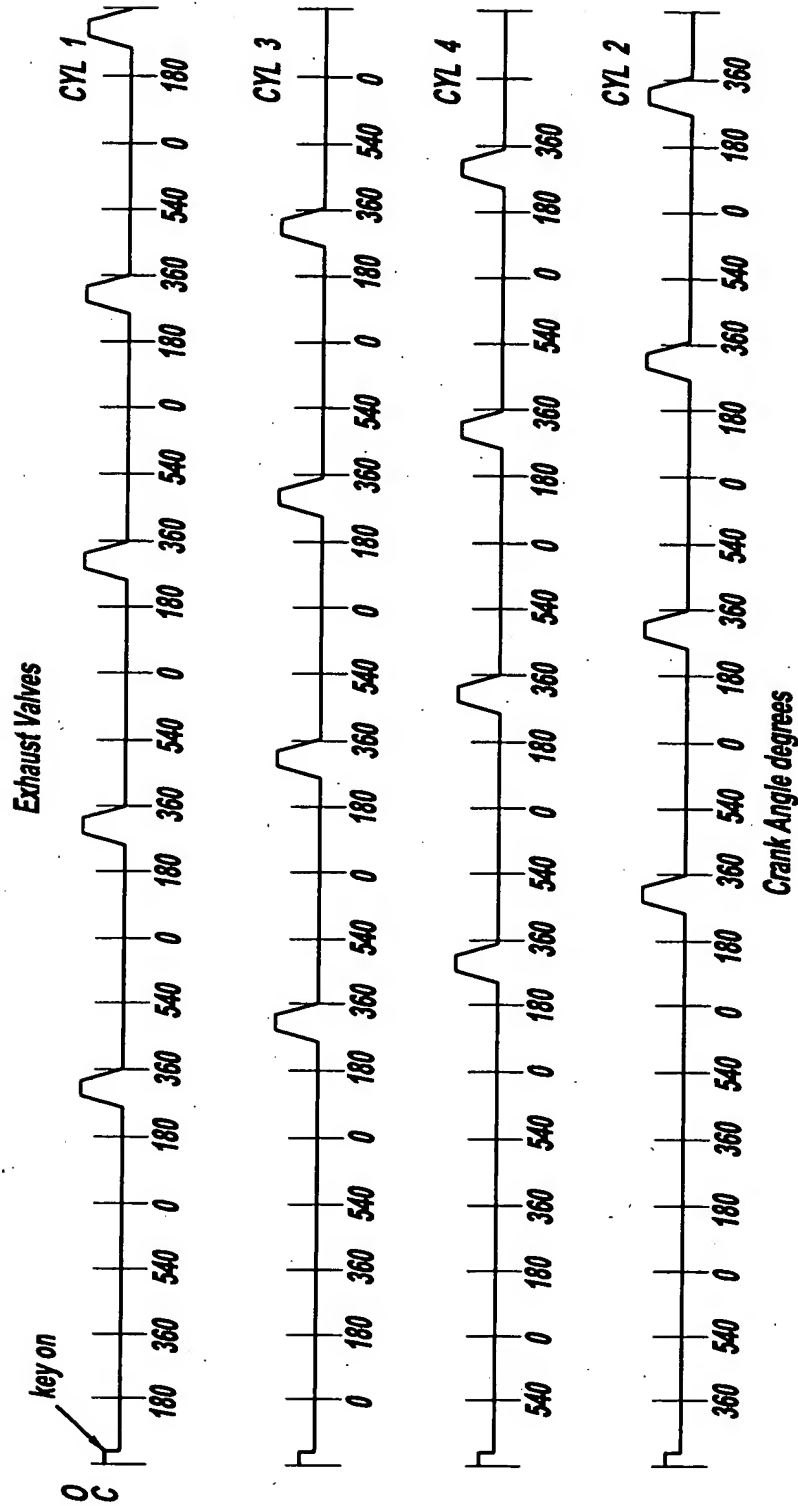
**FIG - 30**

*Speed and Torque Dependant Mode Changes***FIG - 31**

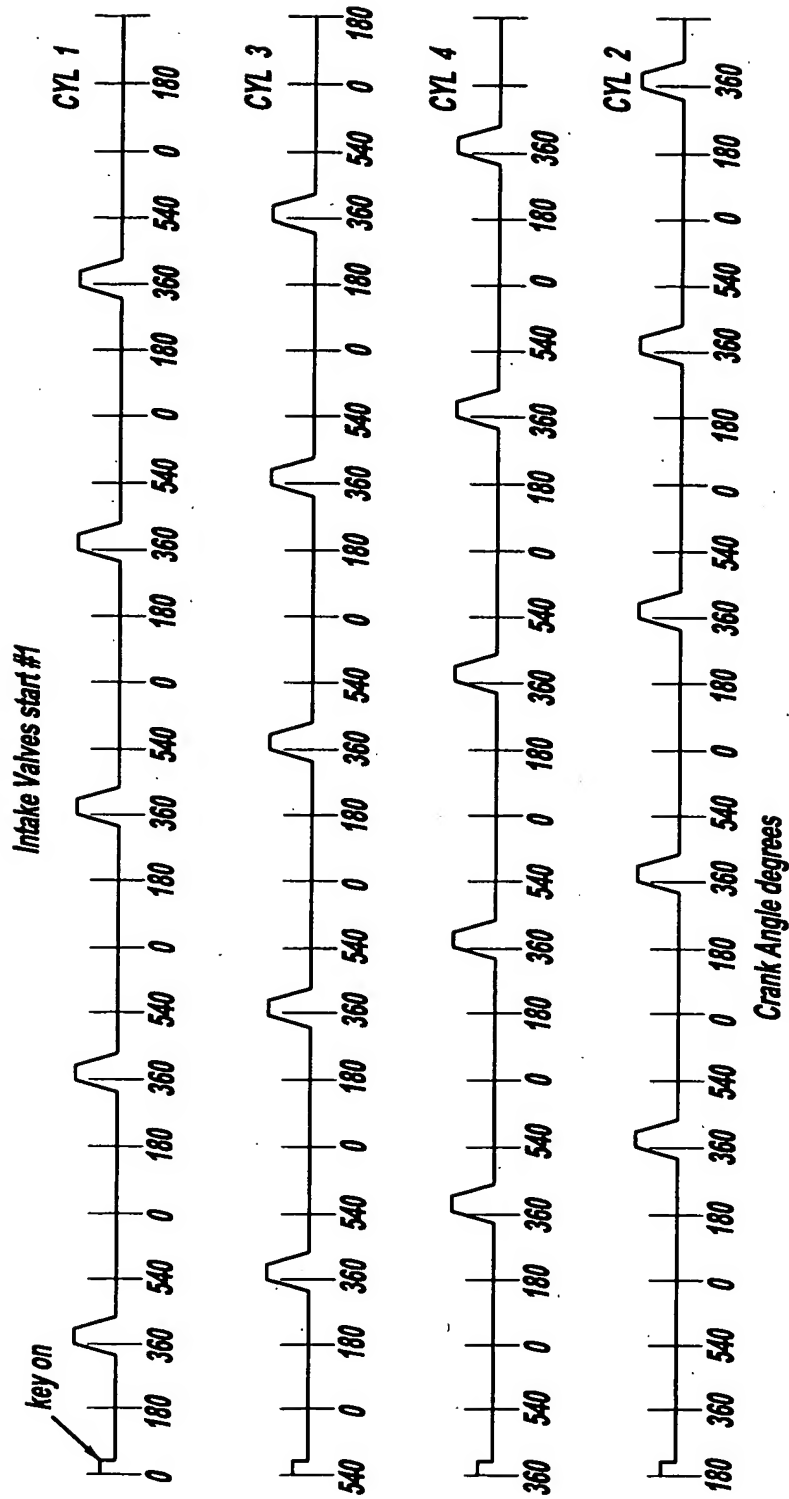




**FIG - 33a**

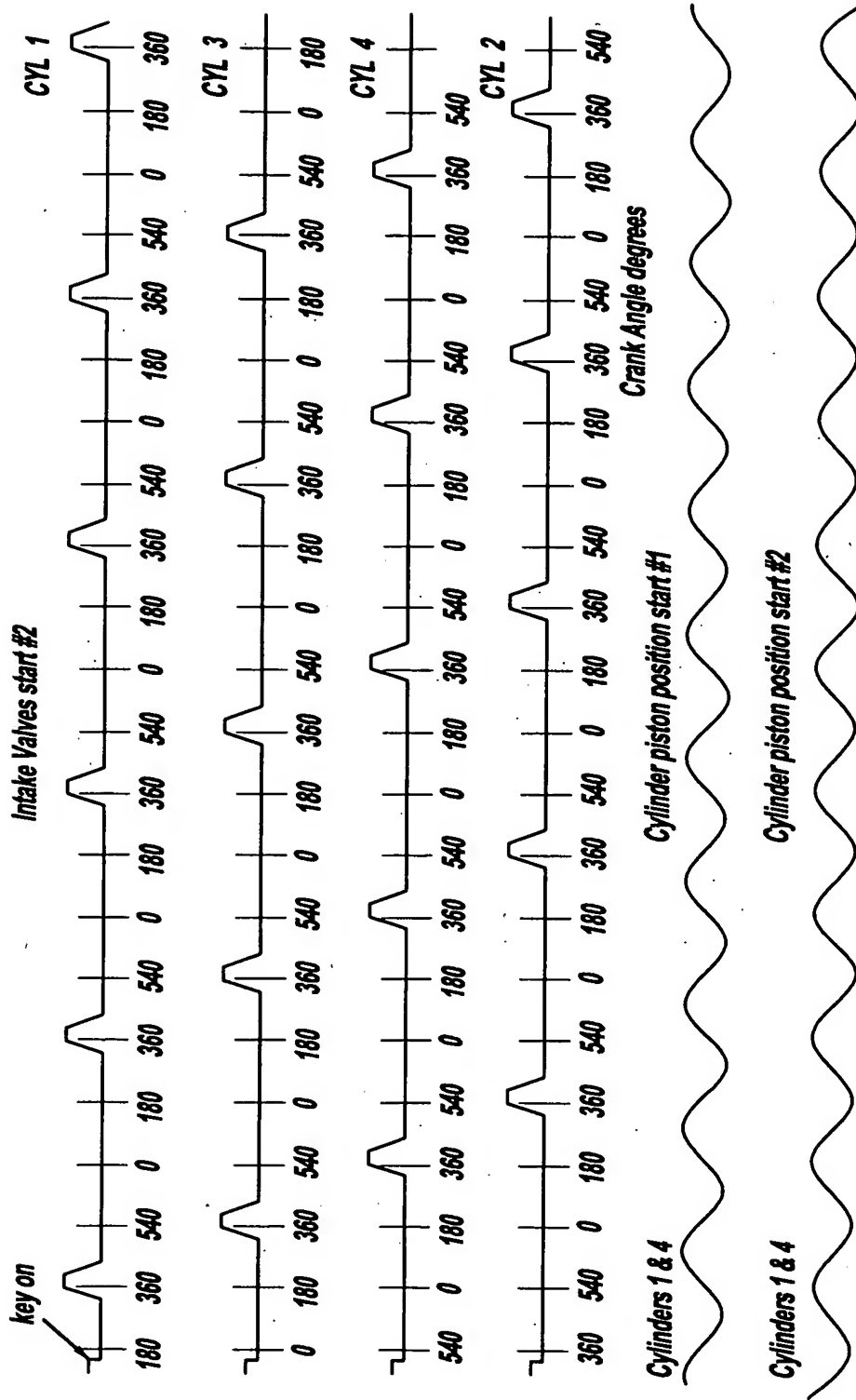


**FIG - 33b**

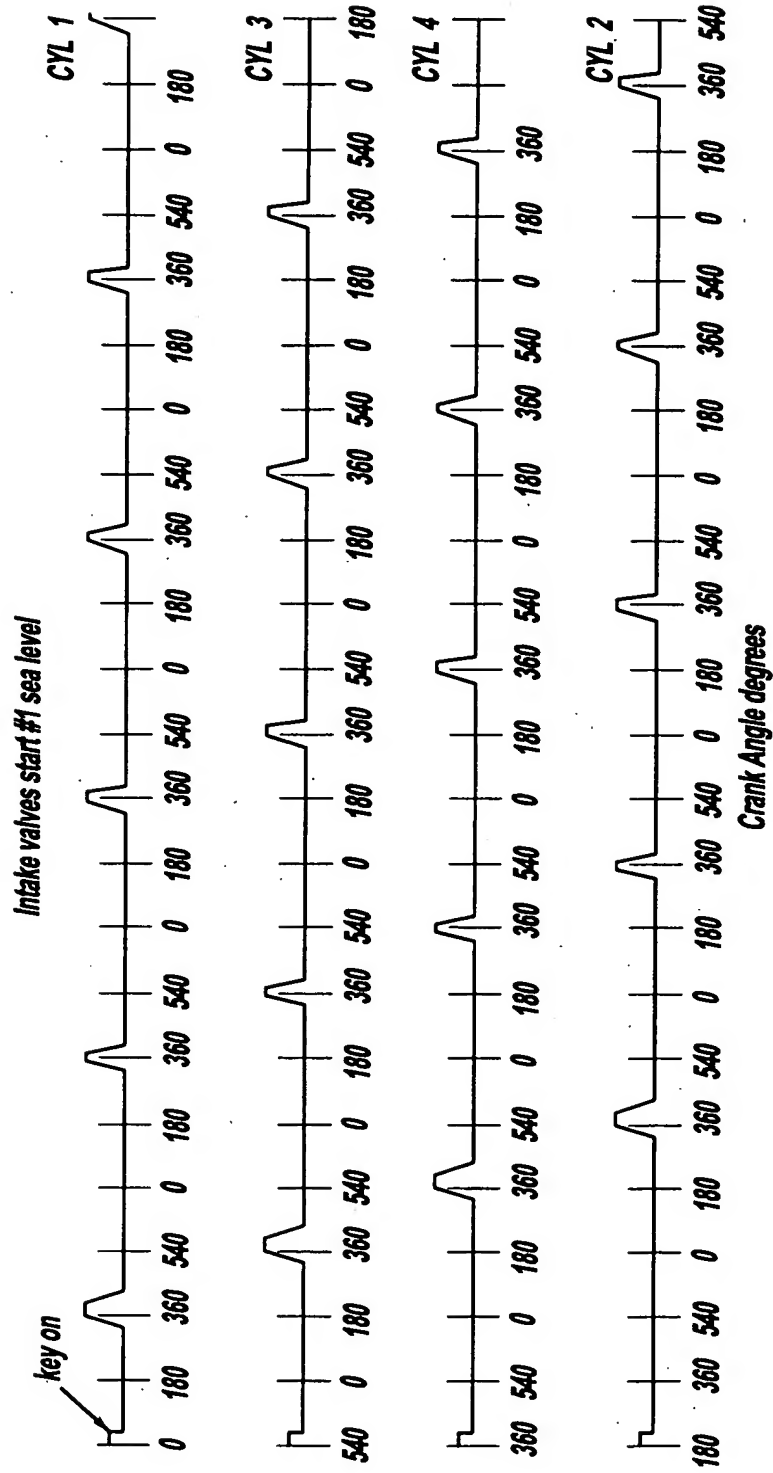


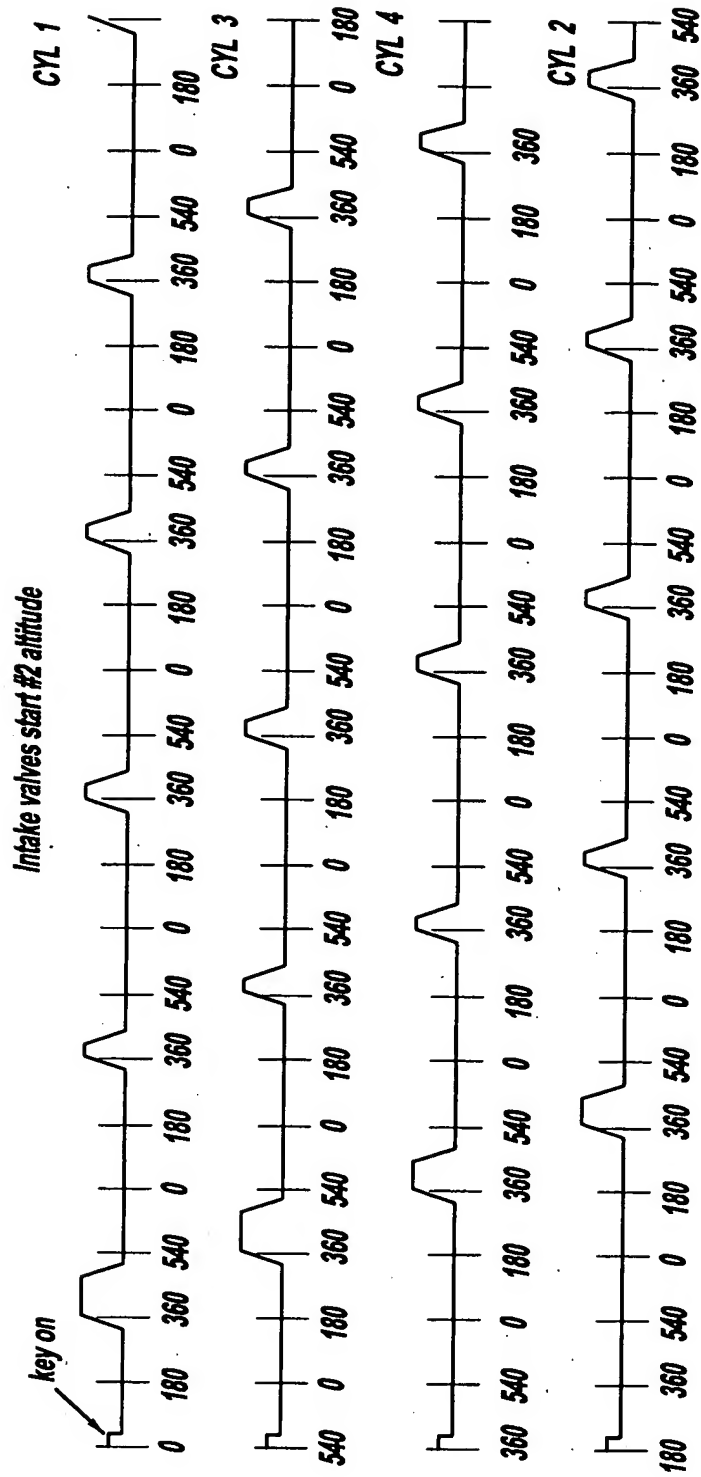
**FIG - 34a**

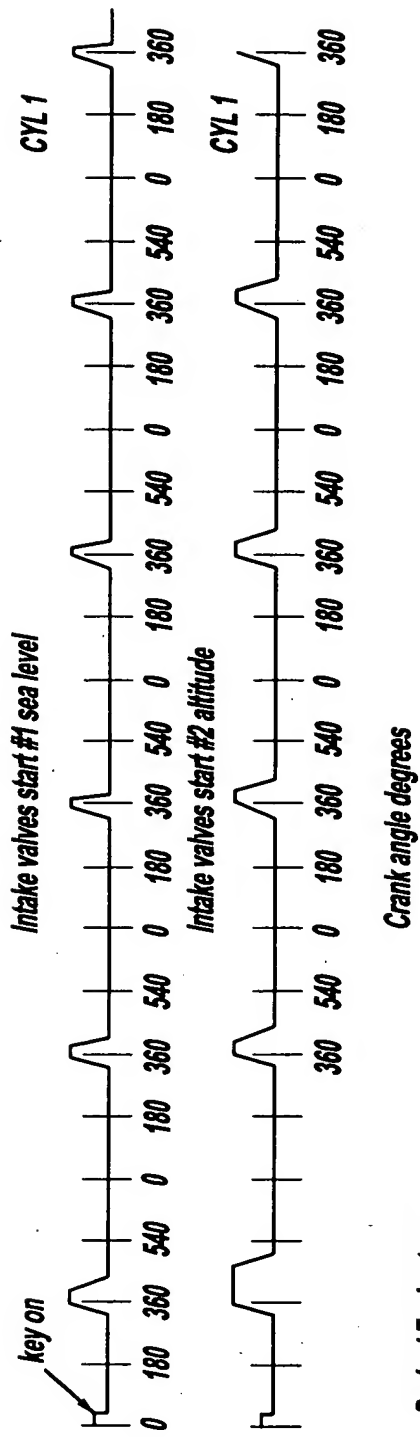




**FIG - 34b**

**FIG - 35a**

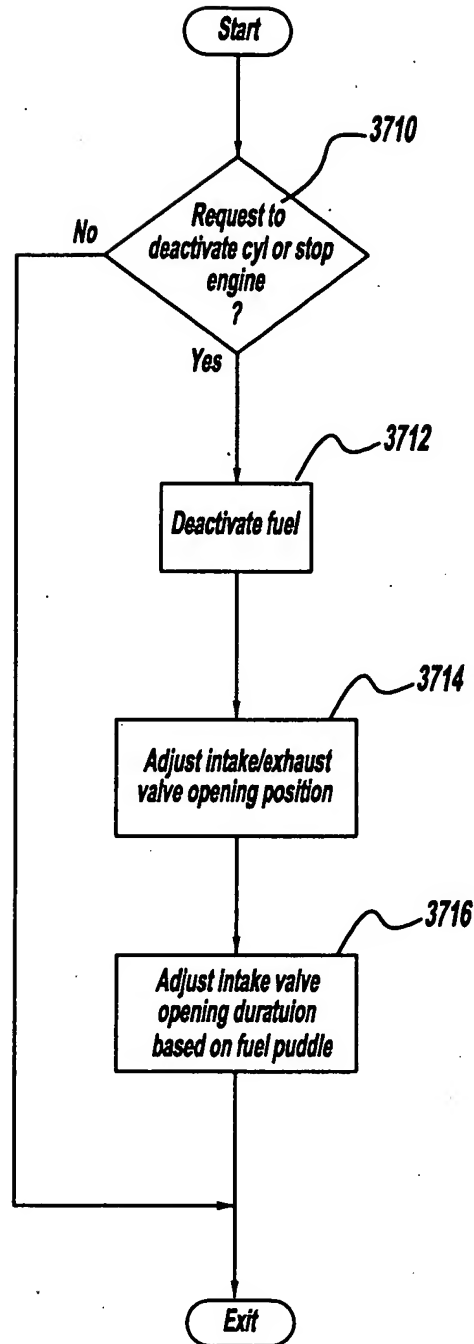
**FIG - 35b**

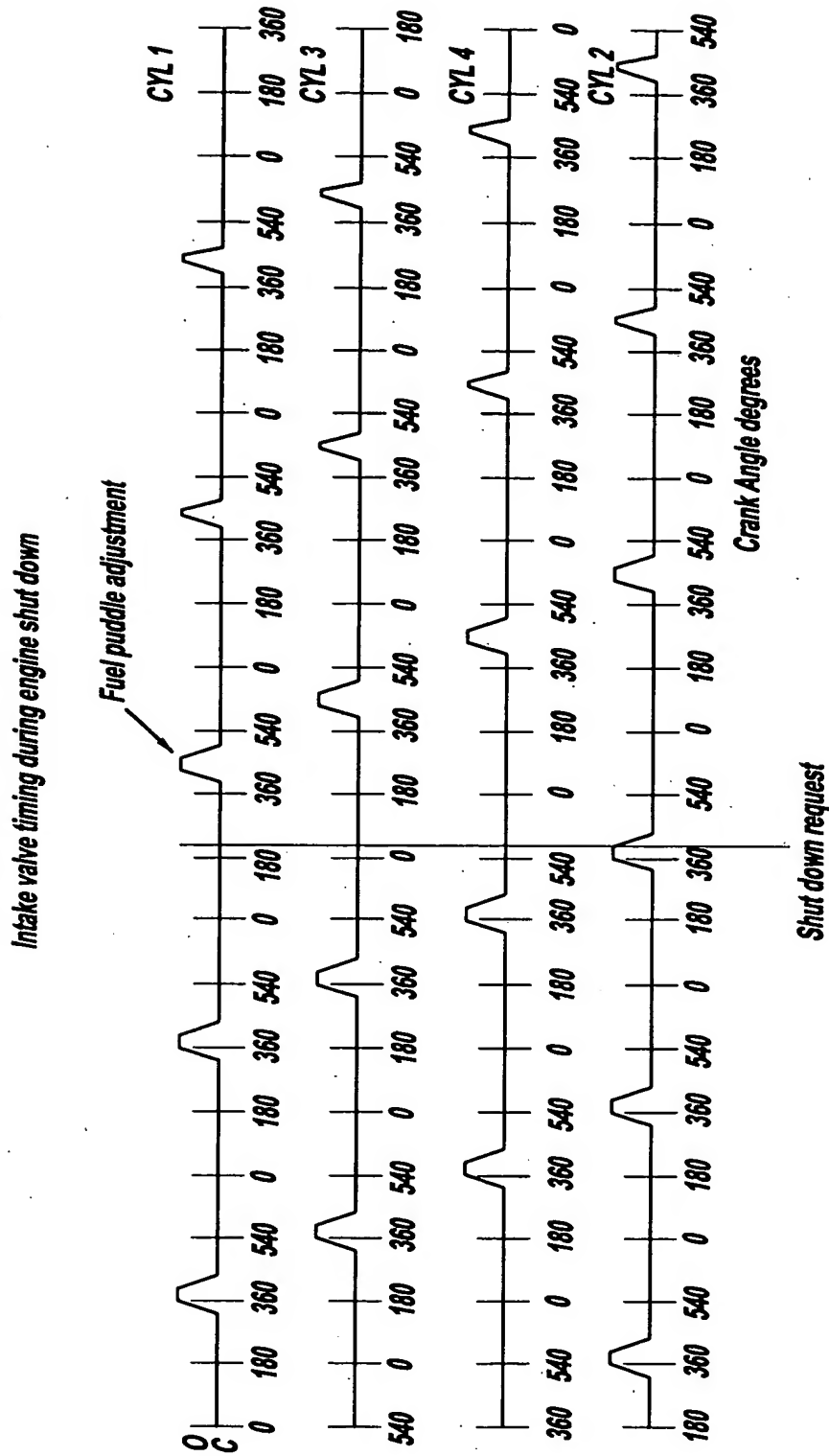


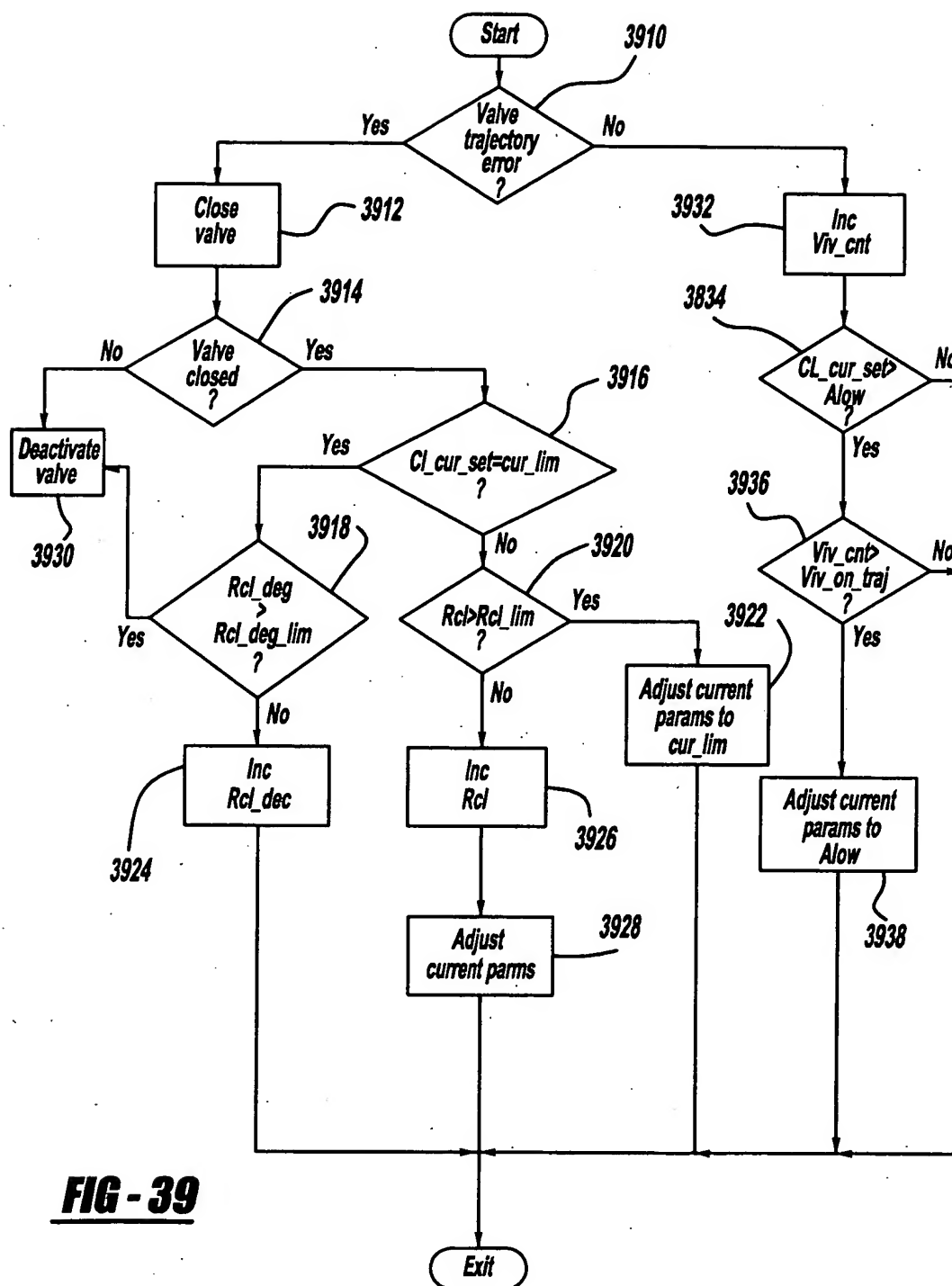
Desired Engine torque

Engine Speed

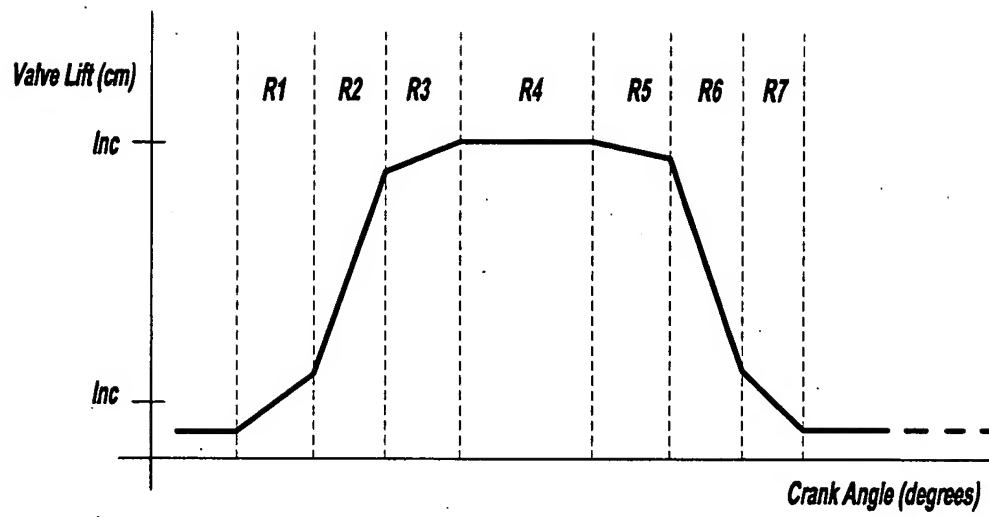
**FIG - 36**

**FIG - 37**

**FIG - 38**

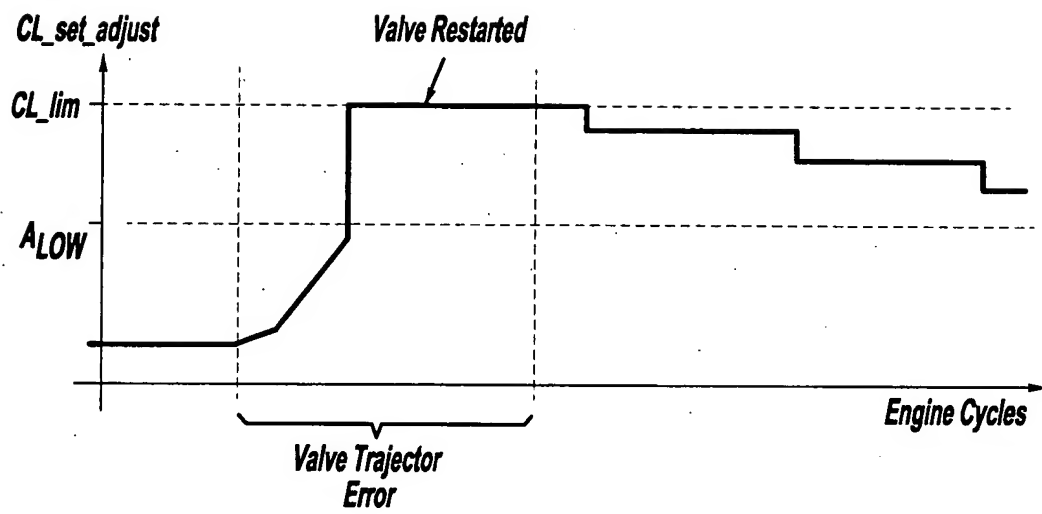


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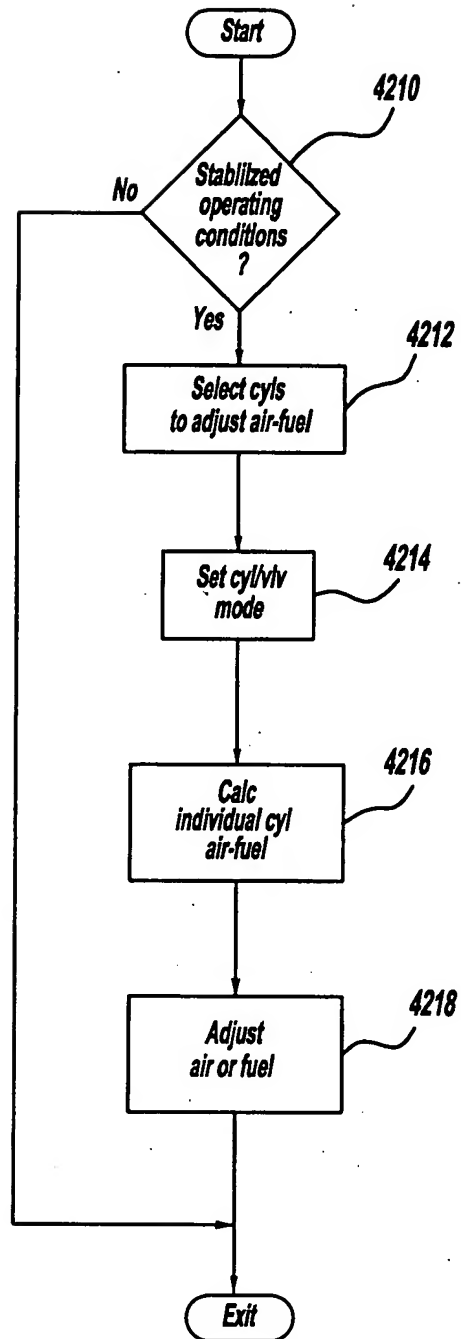


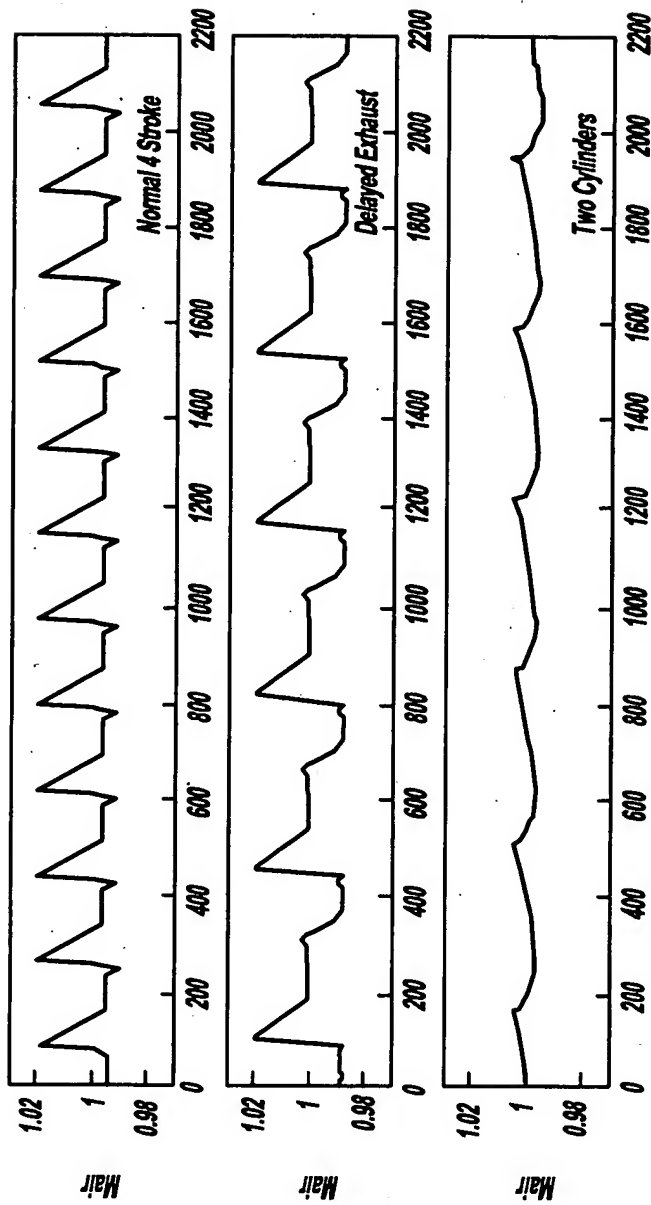
**FIG - 40**



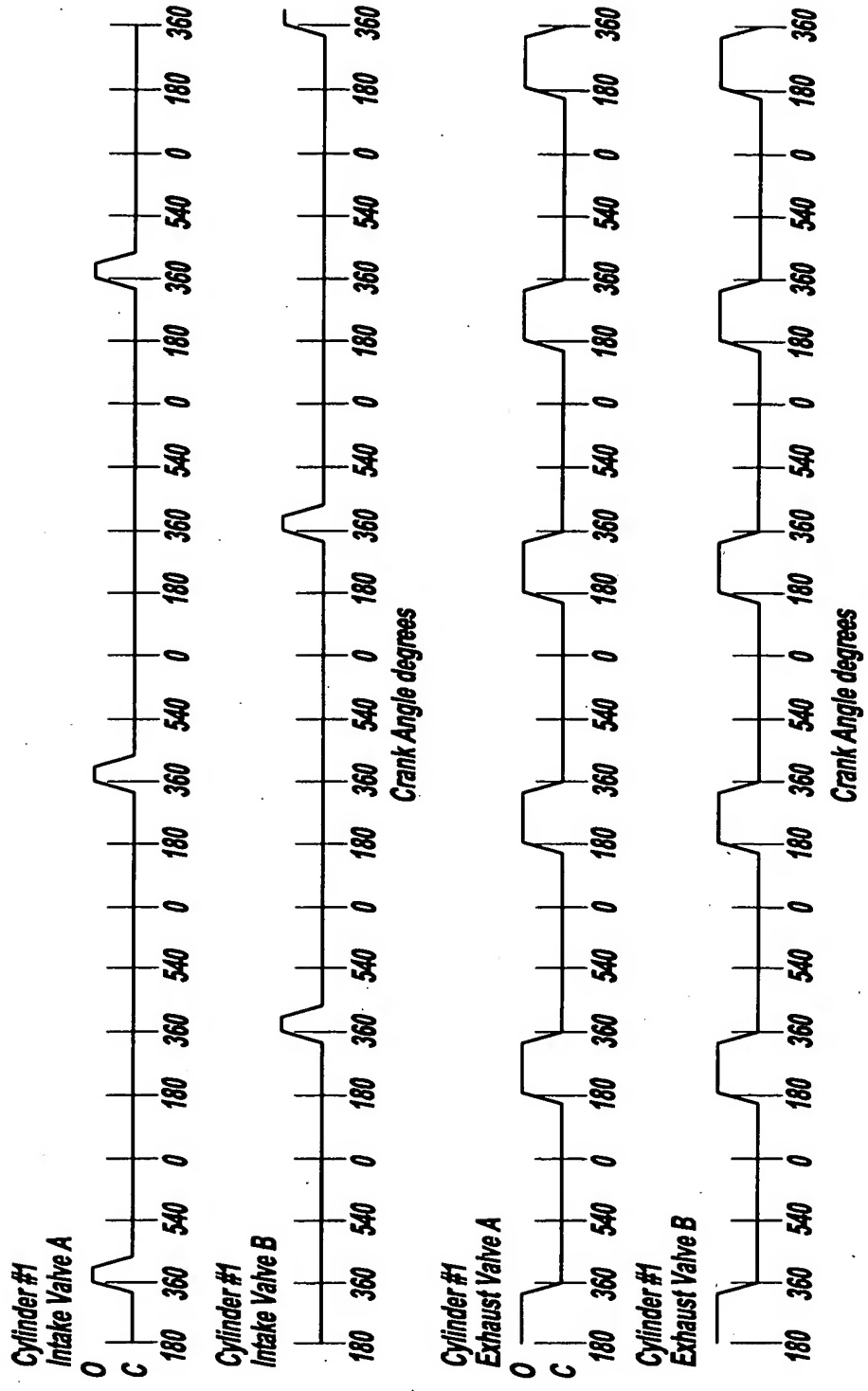


**FIG - 41**

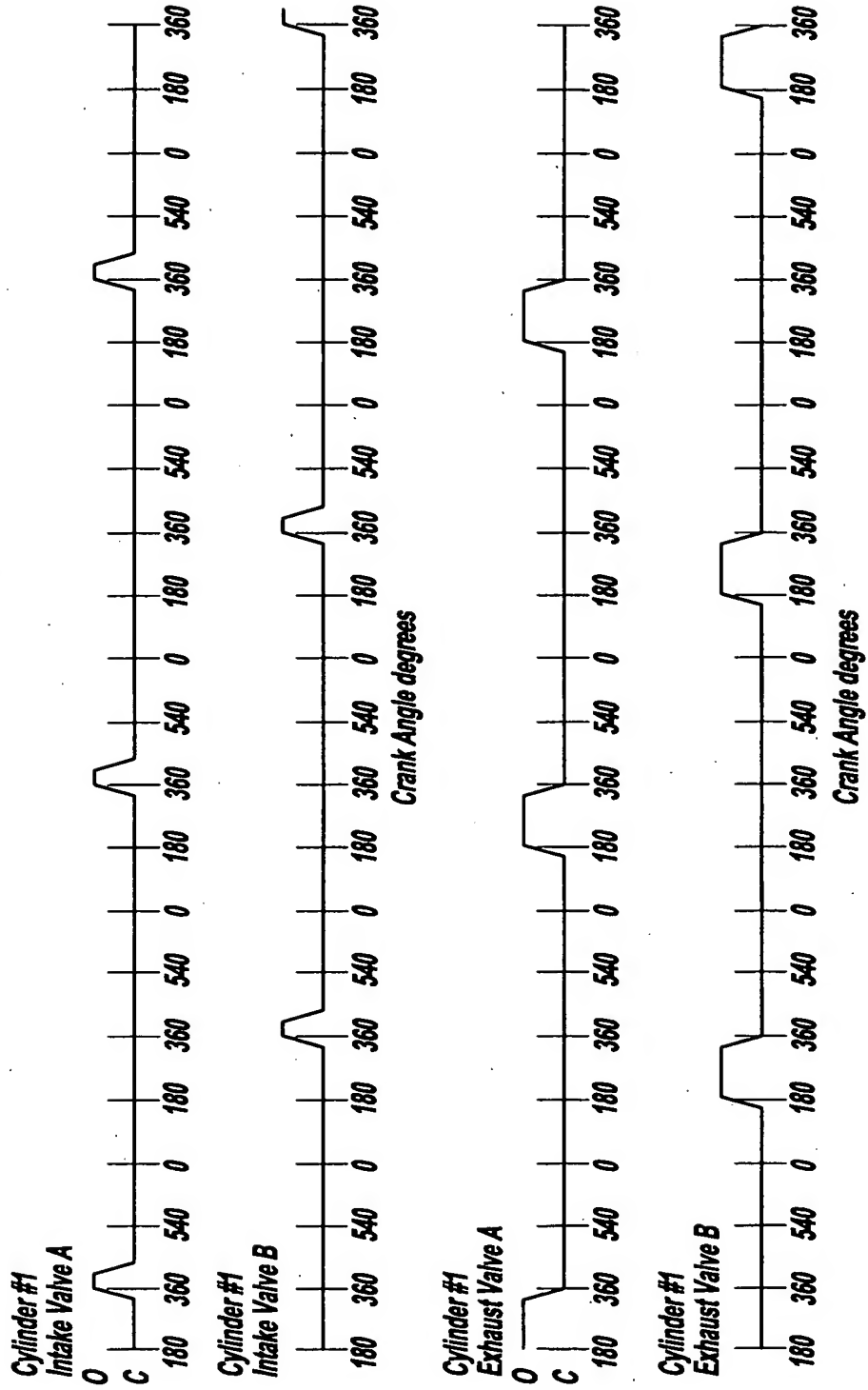
**FIG - 42**



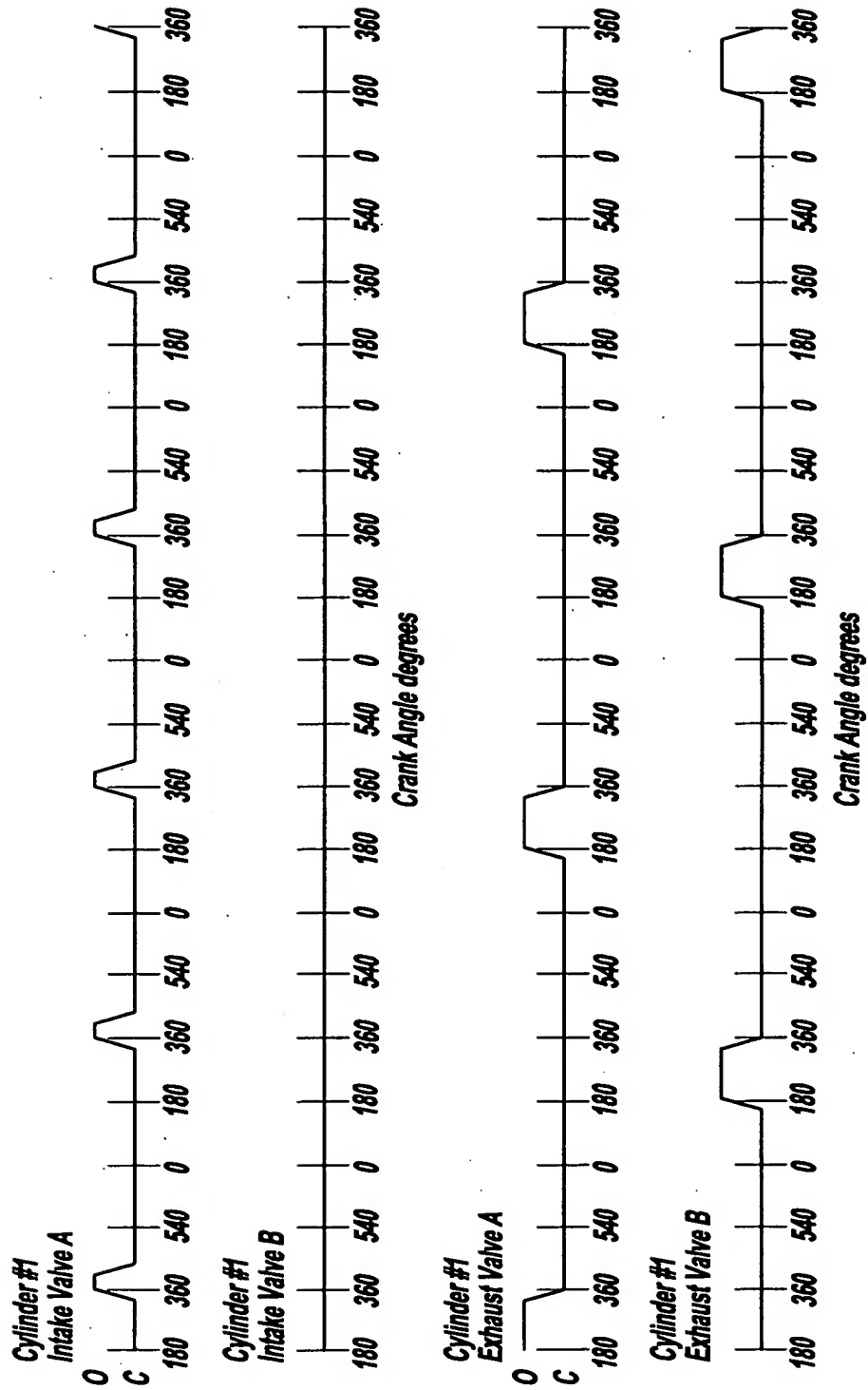
**FIG - 43**



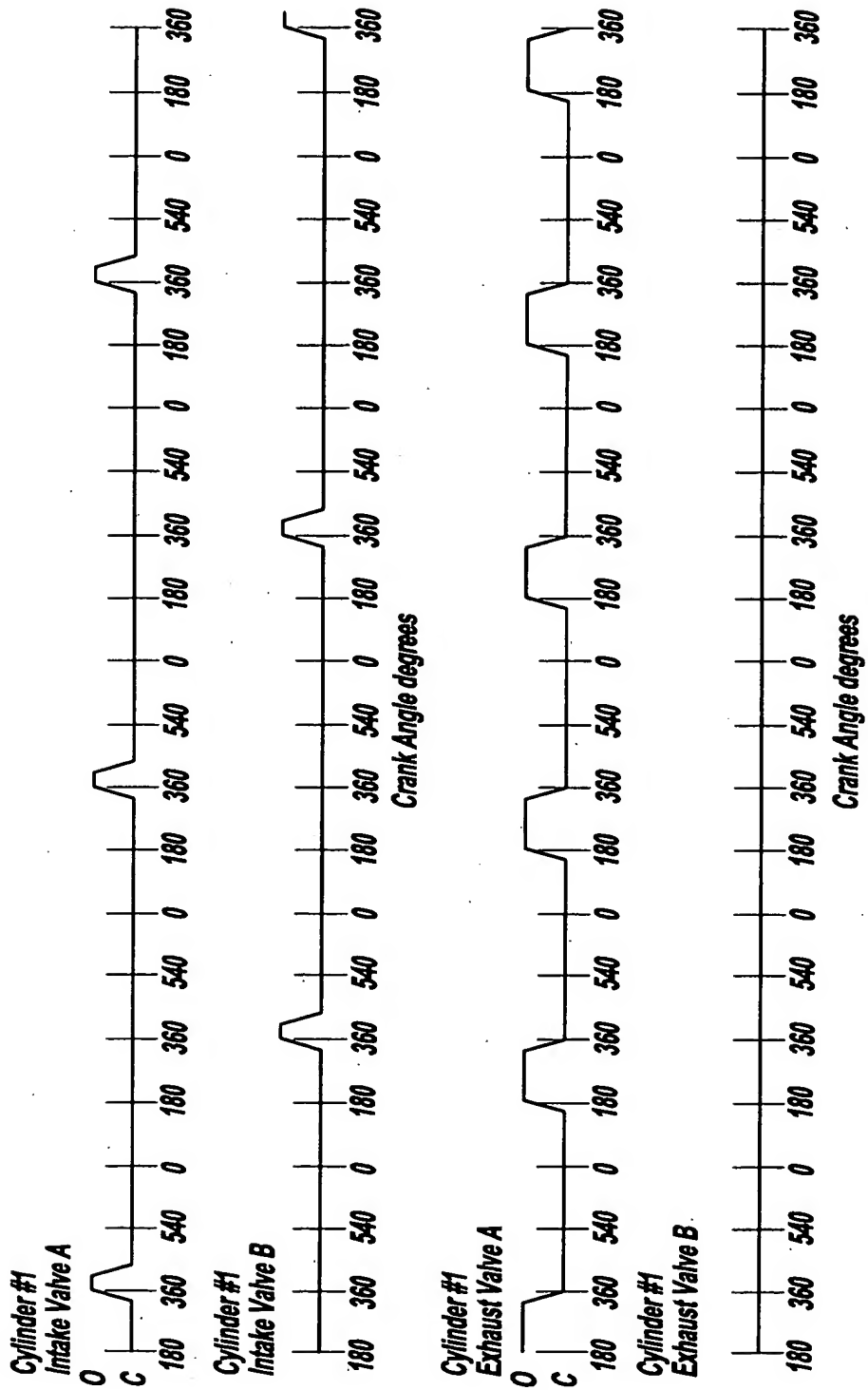
**FIG - 44**

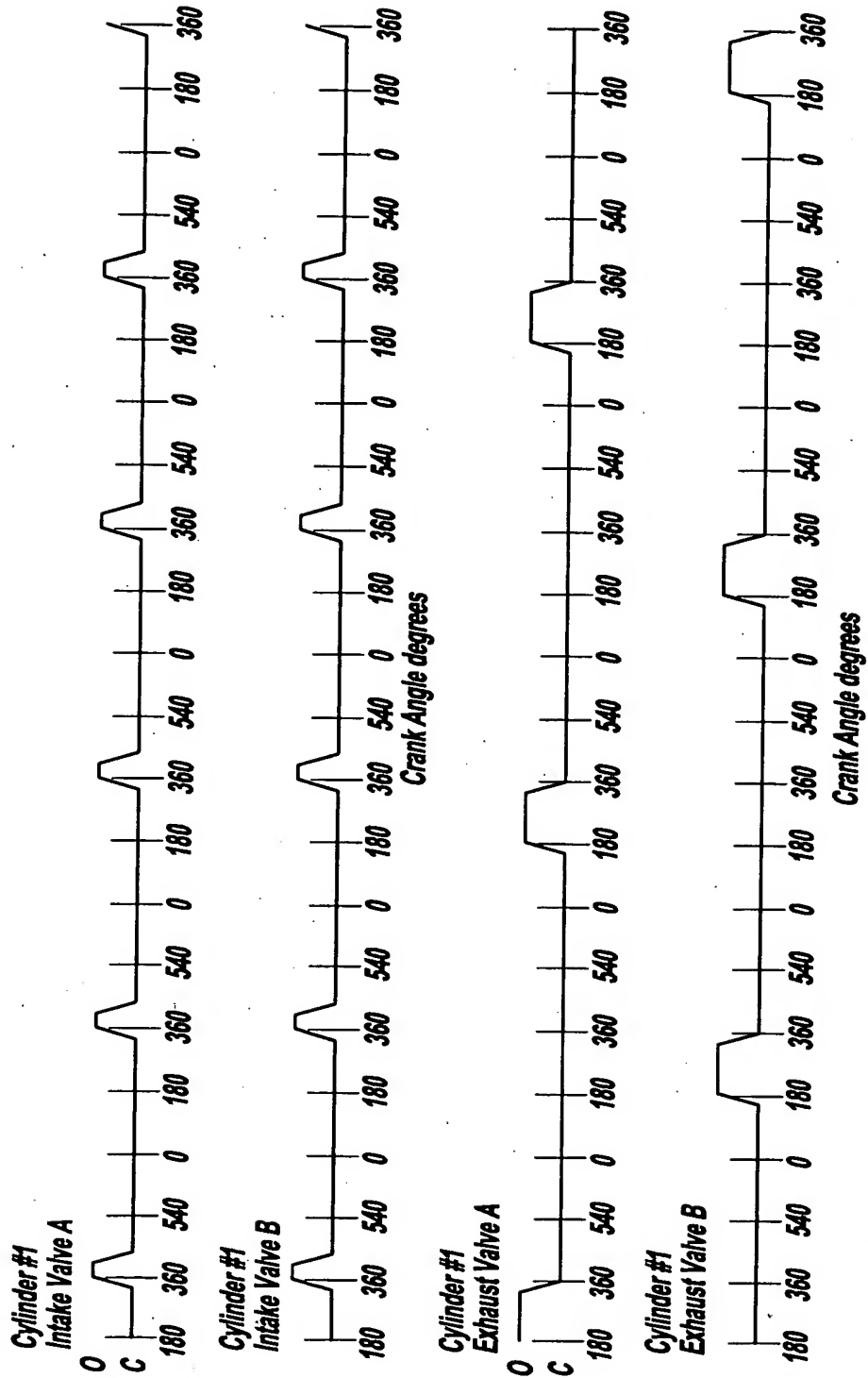


**FIG - 45**



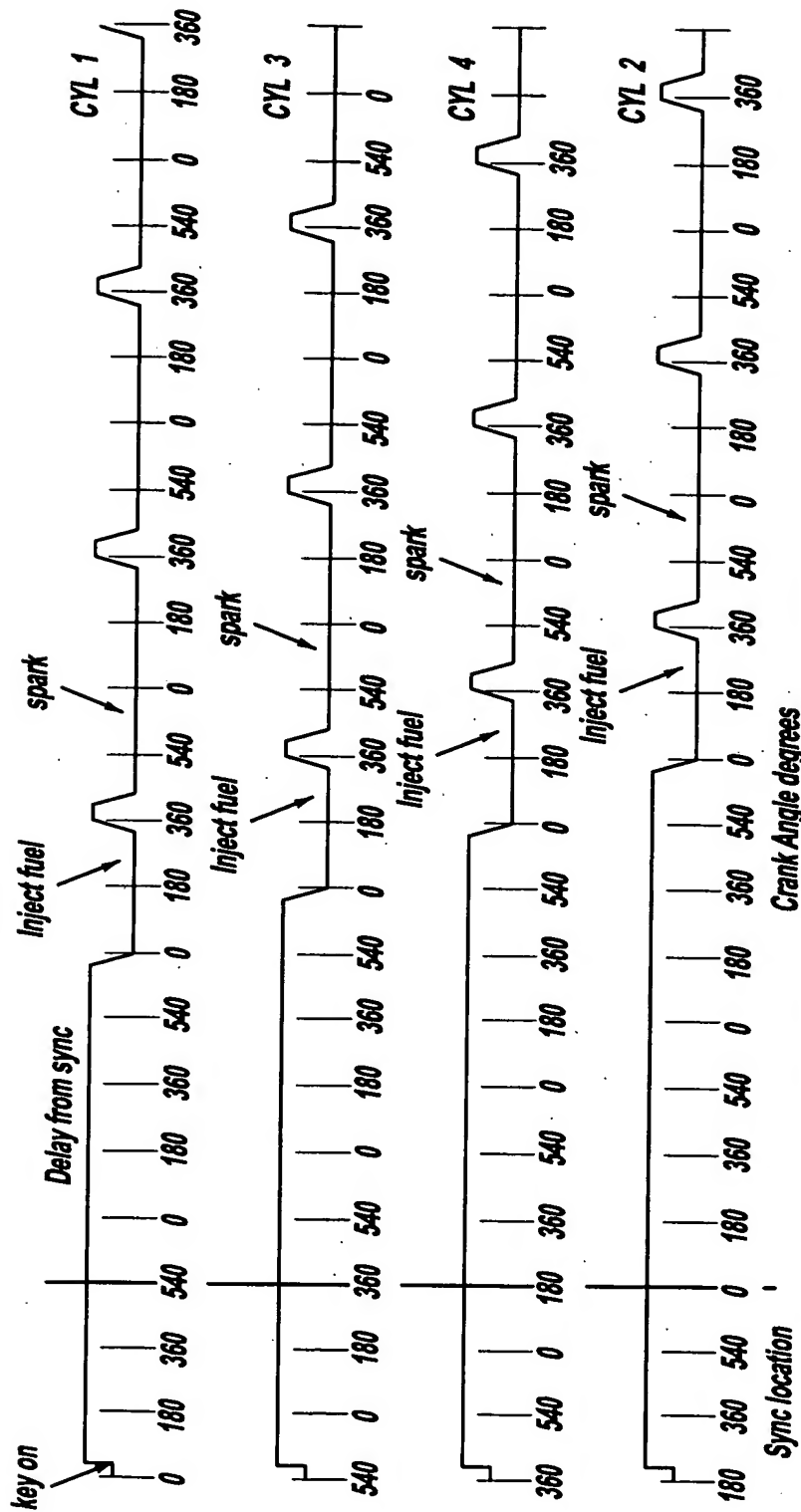
**FIG - 46**

**FIG - 47**

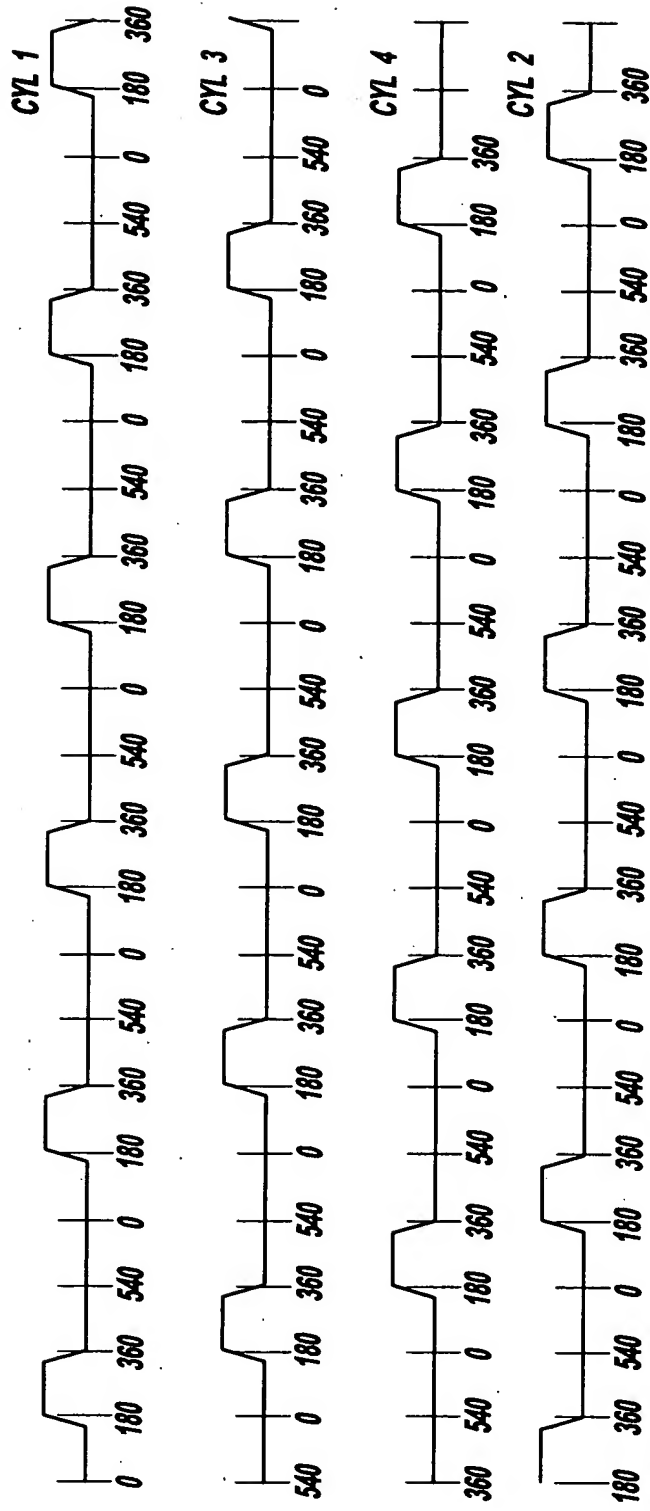


**FIG - 48**





**FIG - 49a**

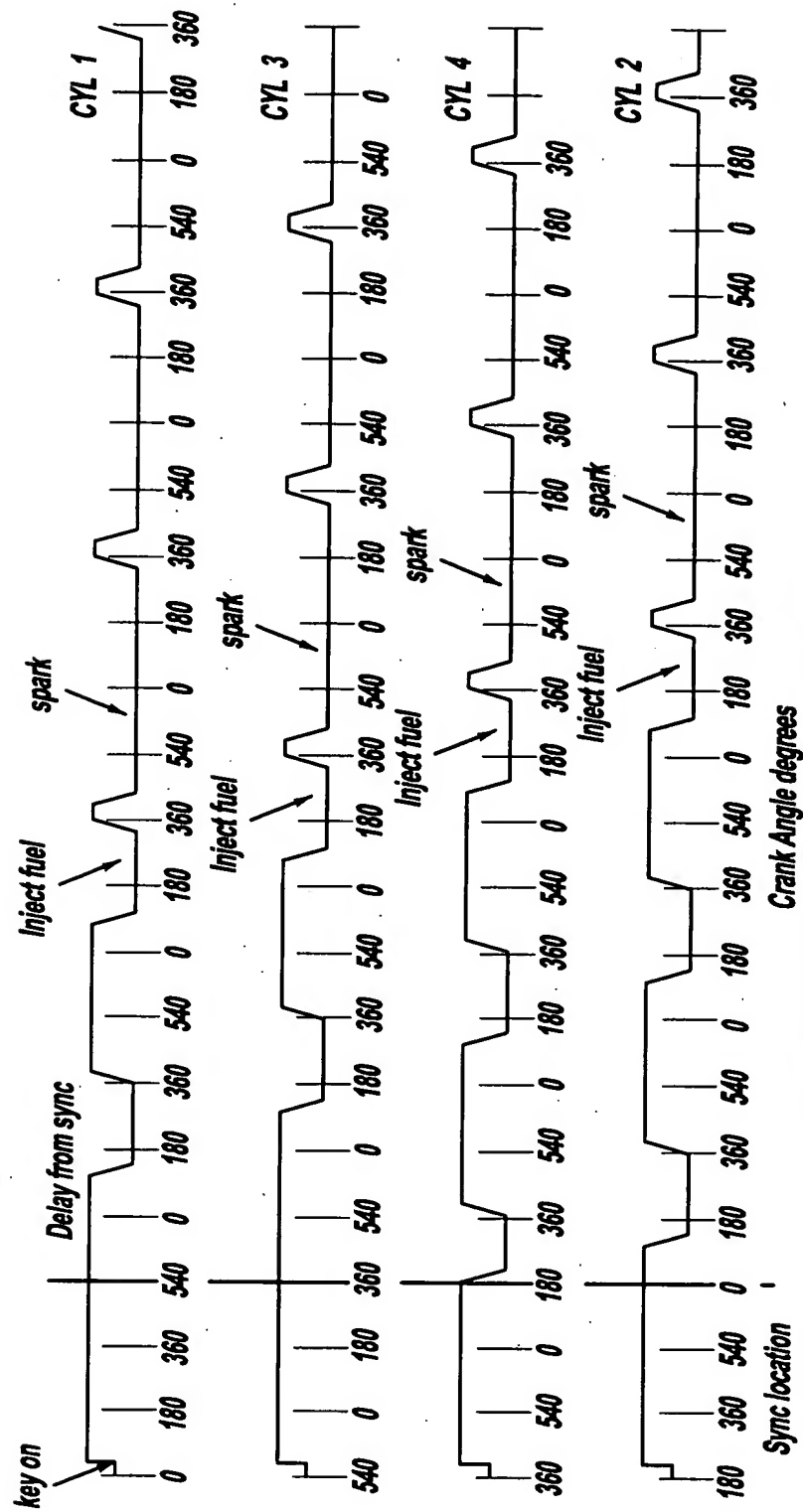


Crank Angle degrees  
Exhaust Valve Timing From Start (mechanical valve operation)

Cylinder piston position cyl 1 & 4

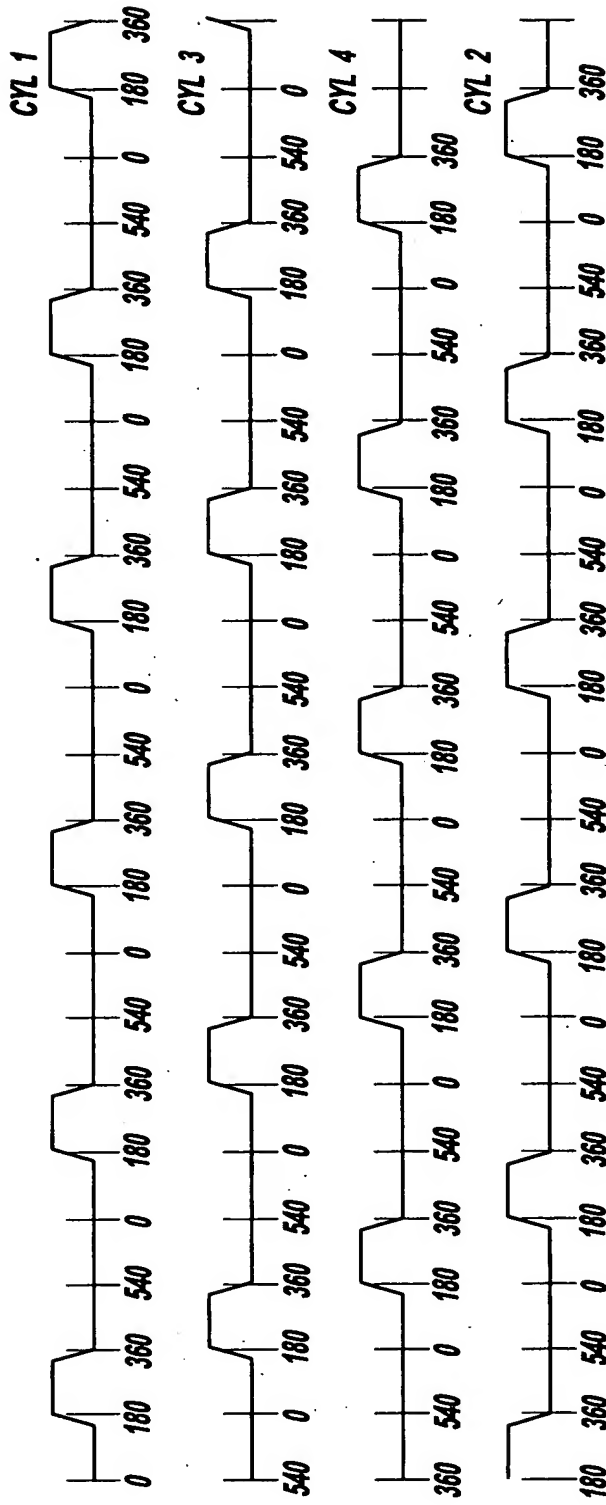
Cylinders 2 & 3

**FIG - 49b**



Crank Angle degrees  
Intake Valve Timing From Start (electrical valve operation)

**FIG - 50a**



Crank Angle degrees  
Exhaust Valve Timing From Start (mechanical valve operation)

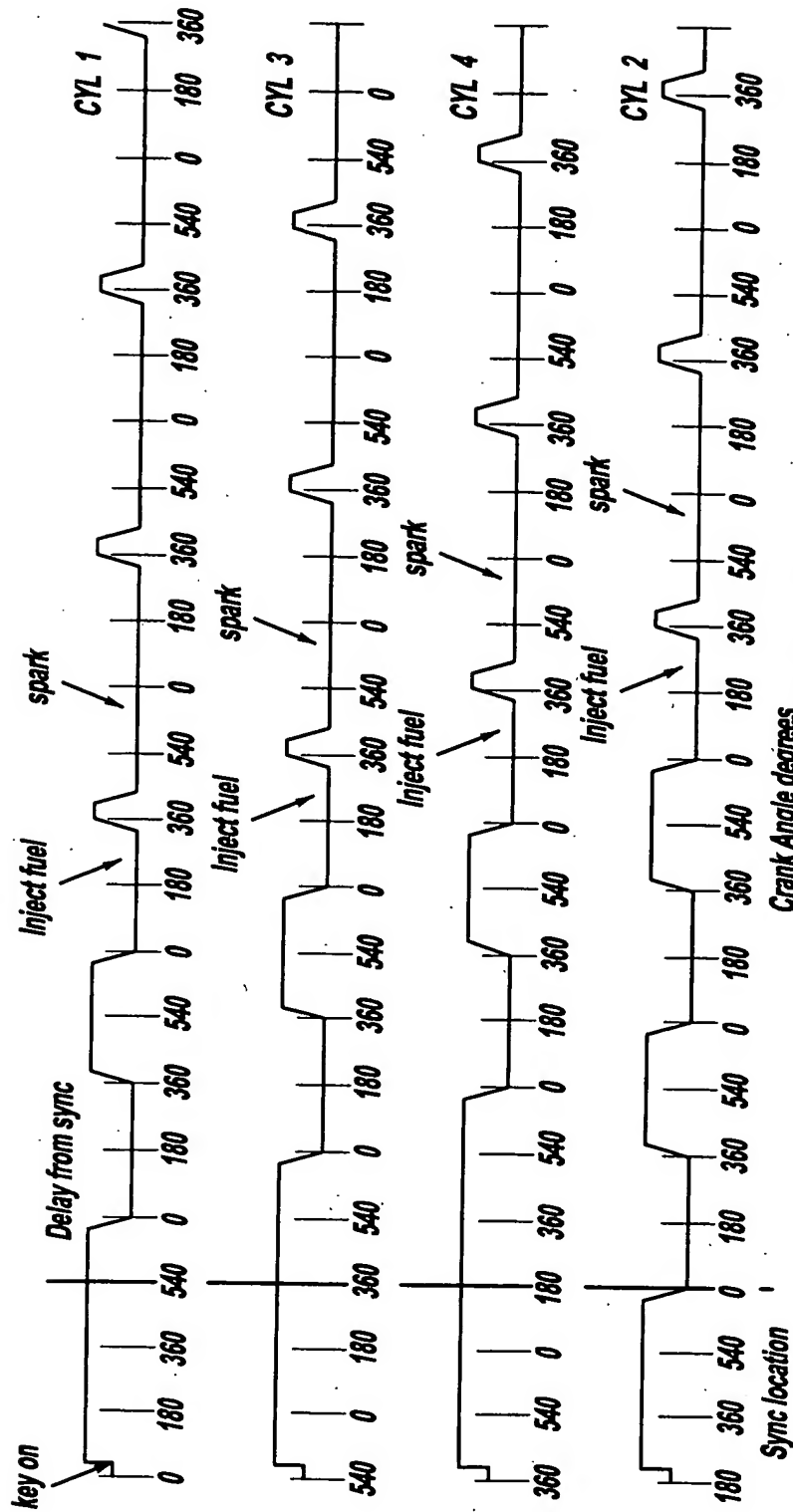
Cylinder piston position cyl 1 & 4



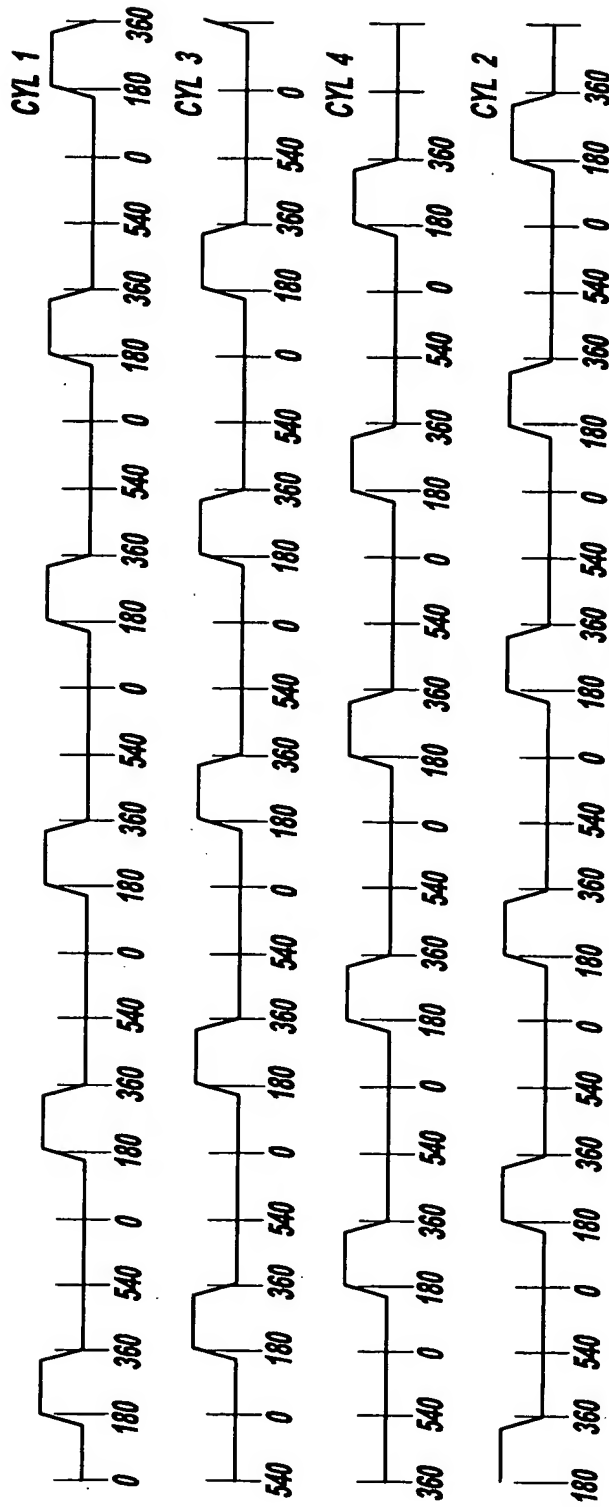
Cylinders 2 & 3



**FIG - 50b**



**FIG - 51a**



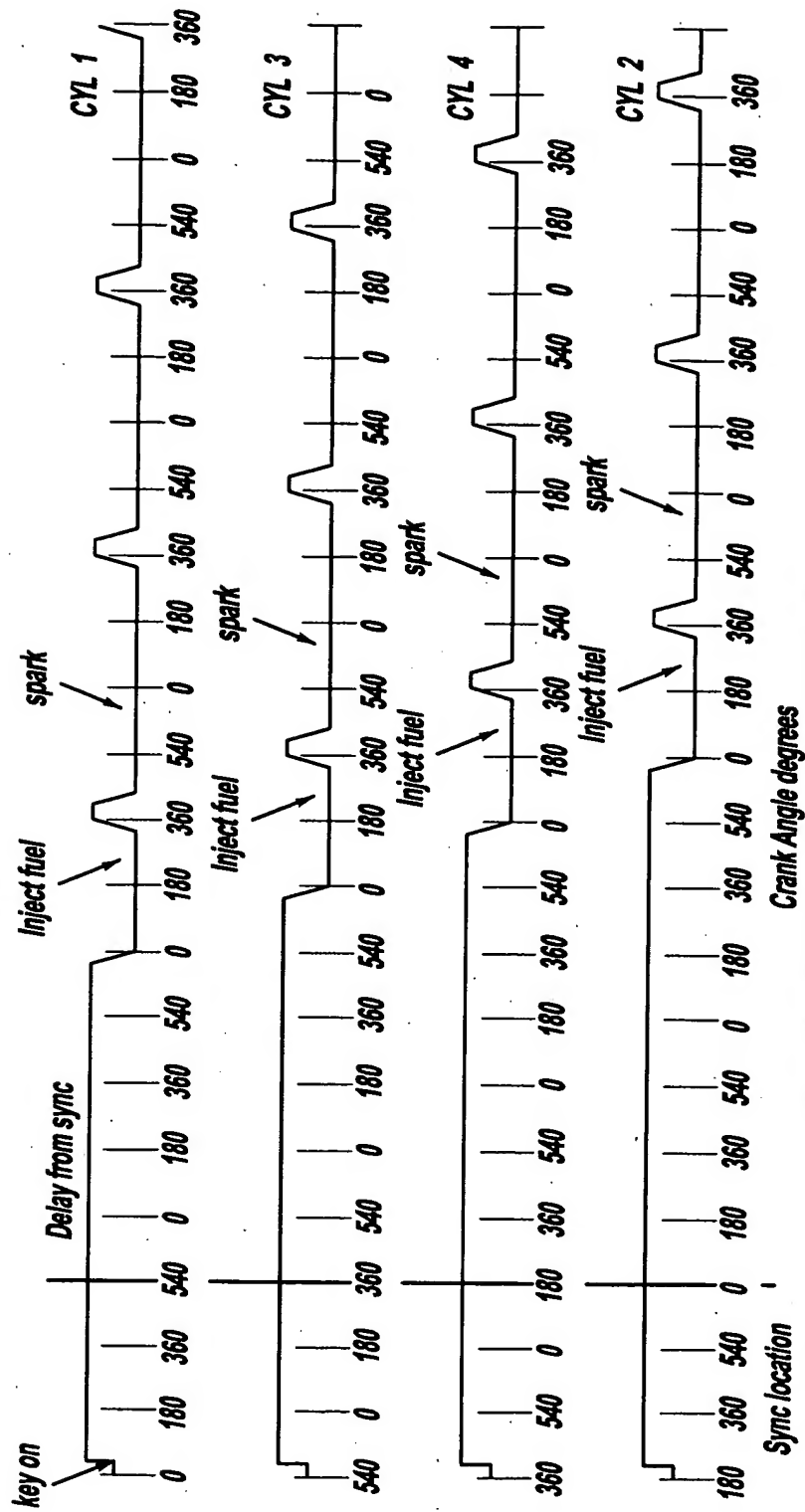
Crank Angle degrees

Exhaust Valve Timing From Start (mechanical valve operation)

Cylinder piston position cyl 1 & 4

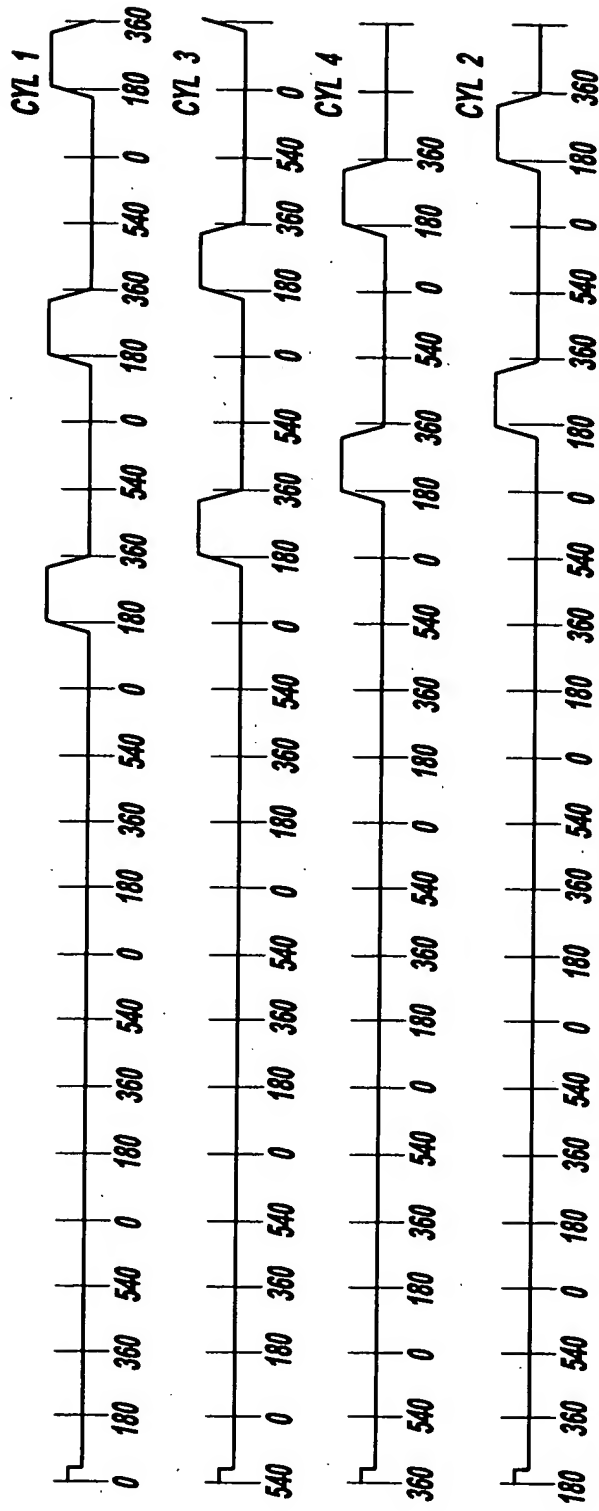
Cylinders 2 & 3

**FIG - 51b**



Intake Valve Timing From Start (electrical valve operation)

**FIG - 52a**



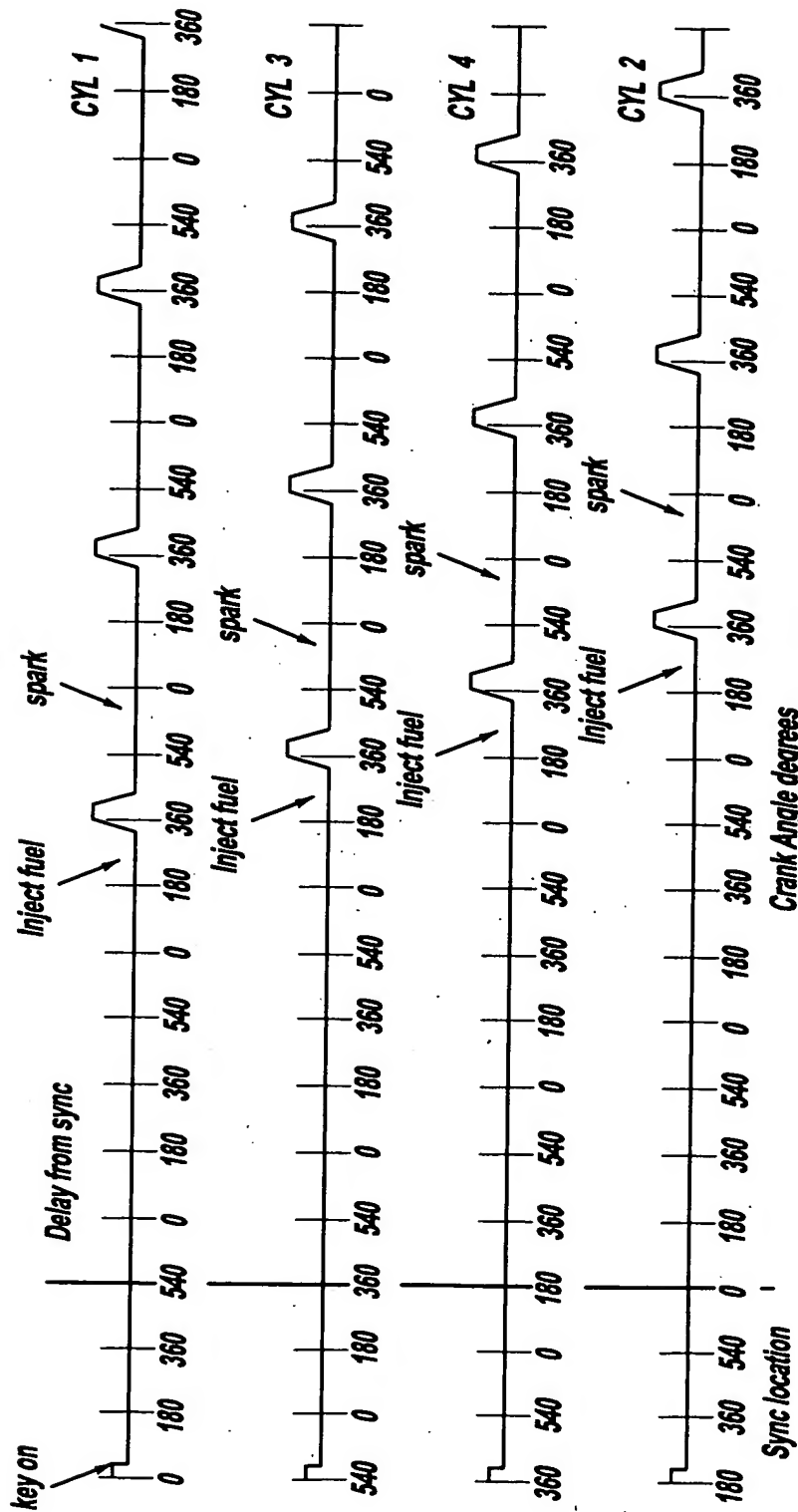
Crank Angle degrees  
Exhaust Valve Timing From Start (electrical valve operation)

Cylinder piston position cyl 1 & 4

Cylinders 2 & 3

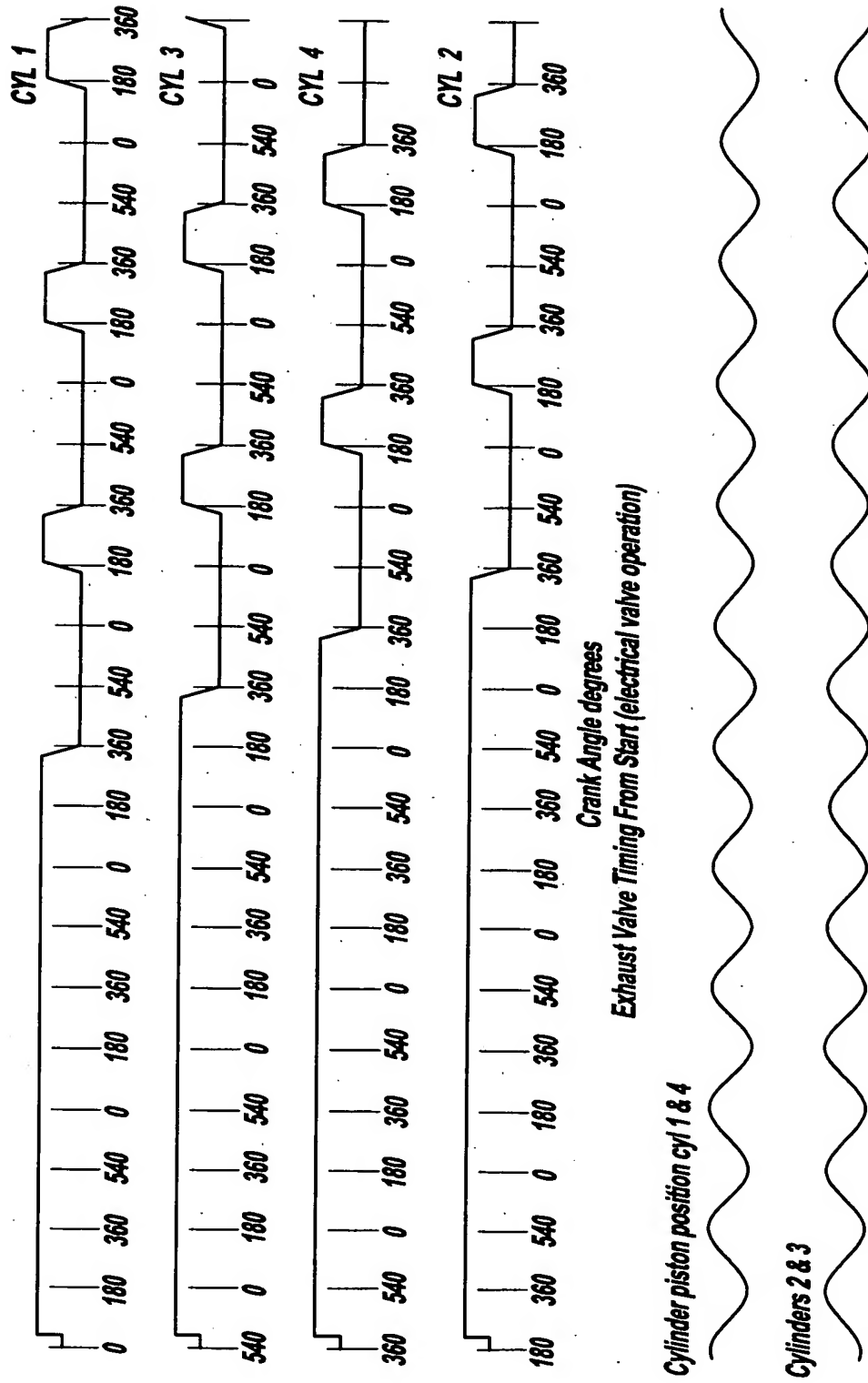
**FIG - 52b**



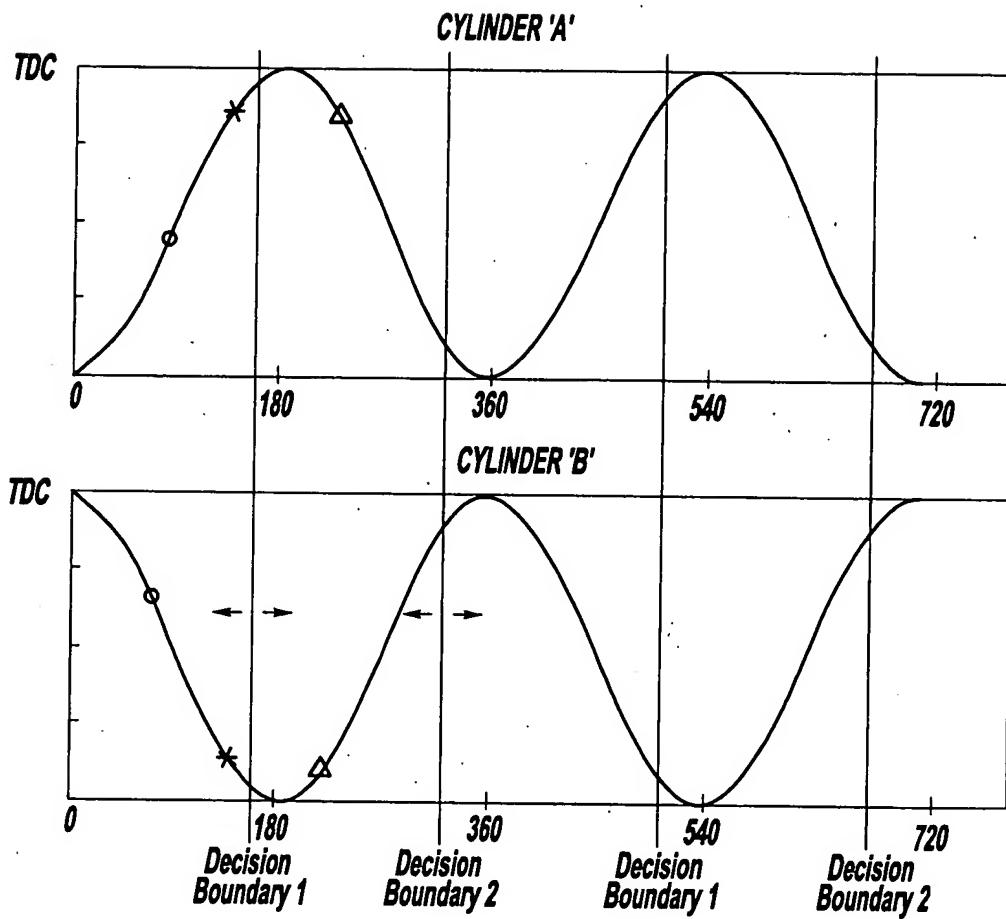


Crank Angle degrees  
Intake Valve Timing From Start (electrical valve operation)

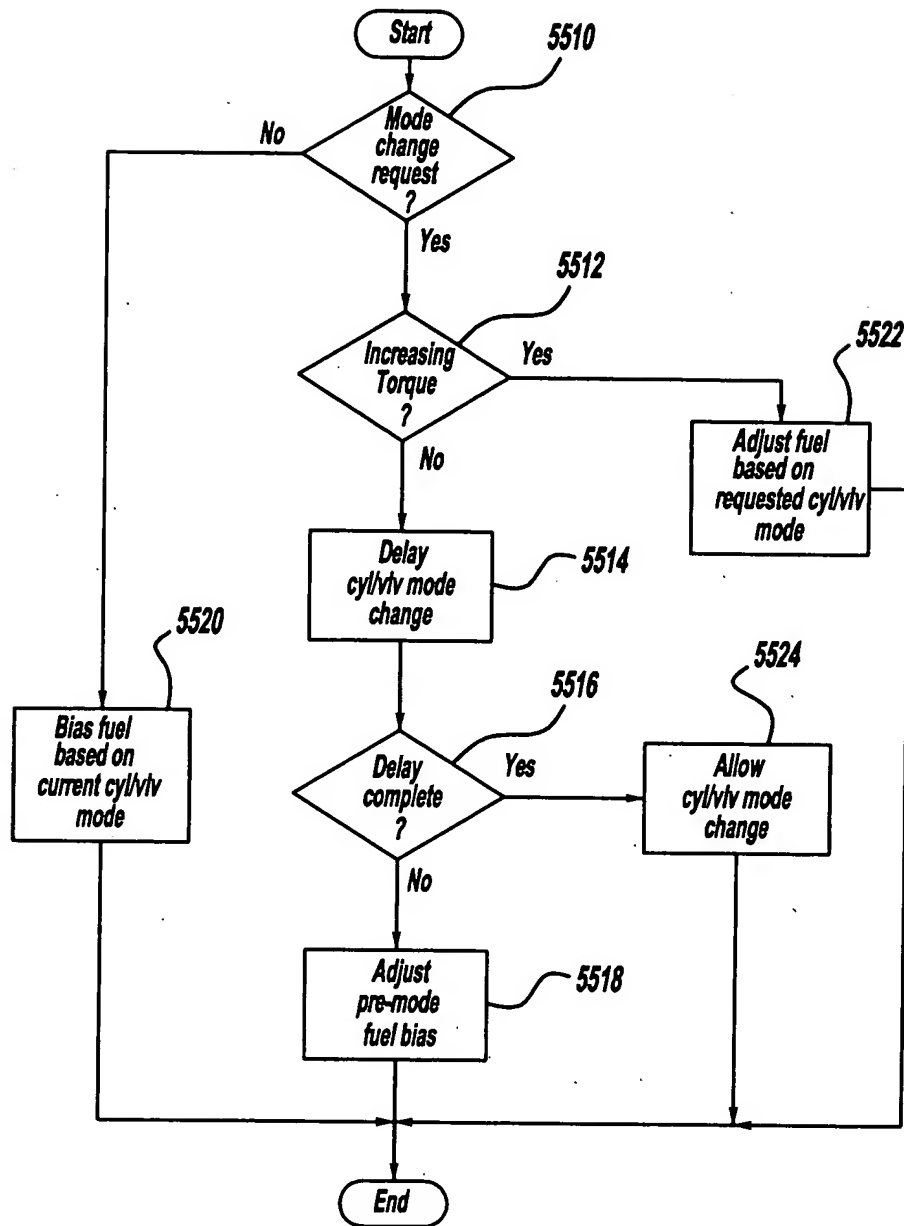
**FIG - 53a**

**FIG - 53b**

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**FIG - 54**

**FIG - 55**